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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

HEARINGS

BEFORE THE

COMMITTEE ON ARMED SERVICES
UNITED STATES SENATE

ONE HUNDRED FIRST CONGRESS

FIRST SESSION

ON

S. 1085

AUTHORIZING APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991 FOR MILITARY ACTIVITIES OF THE DEPARTMENT OF DEFENSE, FOR MILITARY CONSTRUCTION, AND FOR DEFENSE ACTIVITIES OF THE DEPARTMENT OF ENERGY, TO PRESCRIBE PERSONNEL STRENGTHS FOR SUCH FISCAL YEARS FOR THE ARMED FORCES, AND FOR OTHER PURPOSES

PART 4
PROJECTION FORCES AND REGIONAL DEFENSE

MARCH 10; APRIL 20; MAY 2, 15; JUNE 5, 1989

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DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

FRIDAY, MARCH 10, 1989

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

STATE AND CAPABILITIES OF THE U.S. MARINE CORPS

The subcommittee met in open session at 10:07 a.m., in room SR-222, Russell Senate Office Building, Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Exon, Dixon, Glenn, Warner, Cohen, McCain, and Gorton.

Committee staff members present: Arnold L. Punaro, staff director; Richard D. DeBobes, counsel; and Kathryn E. Bognovitz, special assistant.

Professional staff members present: James R. Locher III, Michael J. McCord, and Norman G. Mosher.

Minority staff members present: Romie L. Brownlee, deputy staff director for the minority; Durwood W. Ringo, Jr., and Mark B. Robinson, professional staff members.

Staff assistants present: Barbara Gallo, Lori M. Jackson, and Debra A. Rice.

Committee members' assistants present: Jeffrey B. Subko, assistant to Senator Exon; William J. Lynn, assistant to Senator Kennedy; Charles C. Smith, assistant to Senator Dixon; Phillip P. Upschulte, assistant to Senator Glenn; Christopher K. Mellon, assistant to Senator Cohen; Tony Cordesman and Lorne W. Craner, assistants to Senator McCain; and Robert M. Soofer, assistant to Senator Gorton.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

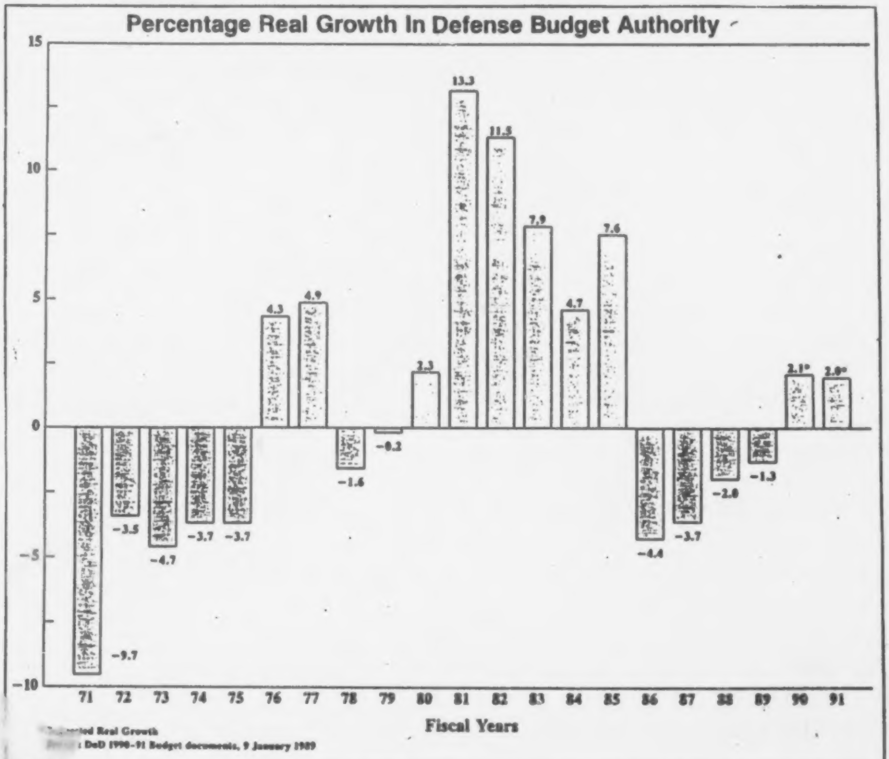
Senator KENNEDY. It is my great pleasure to welcome back before our subcommittee Gen. Alfred Gray, the Commandant of the Marine Corps. General Gray is approaching his second anniversary as the 16th Commandant of the corps. In that time he has made some fundamental changes in the corps. We have invited him here today to discuss those changes and the thinking behind them.

One of the primary reasons for change has been to sharpen the capability of marines for special operations and low intensity conflict. Members of this subcommittee, particularly our ranking member, Senator Cohen, have been leaders in encouraging the United States to improve our capabilities for this form of warfare. We hope to hear today how special operations capabilities have been incorporated into Marine training and doctrine.

I have viewed Marine capabilities for low intensity conflict firsthand. I visited the Persian Gulf in 1987 and met with Col. Frank Libutti and his Marine task force aboard the U.S.S. *Okinawa*. I found those marines to be among the most professional, the most capable, and the most dedicated members of our Armed Forces. As long as America has young people such as I met in the gulf to defend our country, we need never fear for our freedom.

As we consider the budget for fiscal years 1990 and 1991, there are many views on how and where requisite budget reductions can be made to meet our targets. But the threshold requirement is to develop and explain an overall strategy for these reductions.

In theory, stable funding is desirable for proper management of our defense needs. But the fact is that defense spending cycles seem to be inevitable. As the chart shows, periods of substantial defense growth are inevitably followed by periods of decline. As budget levels decline, we should be planning for the day when they will again rise. In other words, we must have a bridging strategy which avoids hollow forces as the budget declines and provides a reliable foundation on which to build in future years.


Percentage Real Growth In Defense Budget Authority

*Projected Real Growth
Source: DoD 1990–91 Budget documents, 9 January 1989

The crucial issue in a bridging strategy is what areas to protect. The essential factors here are the superiority of our technology, particularly in conventional forces, and the quality of our people. In my view, these two areas should receive priority in granting protection from budget cuts.

At the heart of the Pentagon's competitive strategies program is the fundamental premise that our technology is superior to that of our adversaries. We have the ability to introduce, produce and extend technology at a rate that must surely frustrate and discourage the Soviets.

The Marine Corps has been a good model for this achievement over the years, especially in selecting new technology that is completely transforming amphibious warfare. The introduction of a new generation of landing craft more than quadrupling the speed of previous craft, together with the emergence of the tilt rotor aircraft, will revolutionize power projection capabilities.

We also take genuine pride in the innovative and creative abilities of the men and women in our Armed Forces. We must do all we can to keep military compensation and benefits at a level sufficient to retain these high quality personnel. The Commandant will tell us something about this today, and we look forward to his testimony.

Before we hear from General Gray, do you have any comments, Senator Cohen?

Senator COHEN. A couple of brief words. Welcome, General Gray, to our first hearing of this subcommittee.

We have had correspondence. The chairman of the committee, myself and others have recently corresponded with Brent Scowcroft and yourself, trying to impress upon the administration, I believe, the nature of the new threat that we all face.

President Bush mentioned during his inaugural speech a new breeze blowing in Washington. There is a new breeze blowing globally as well, and it comes in the form of insurgency, uprisings, terrorist activities, and terrorist groups—and while nuclear deterrence is important it is not going to deal effectively with these kinds of threats. I think the Soviets learned that high altitude bombing could not defeat what is essentially a political struggle. We should learn from that as well as our own experience.

So we, General Gray, are looking forward to hearing what you have to say. We have your letter. I hope it will be made part of the record later following your remarks.

We have recently been trying to get the administration to do three things, essentially: submit a proposal to make our security assistance program more relevant to Third World countries; establish a mechanism to coordinate U.S. policies in troubled regions of the developing world; and appoint a high level official within the NSC to handle these issues.

So far we have not had much luck, I might say, in terms of establishing the coordinating board, the Low Intensity Conflict Board. It has not even met; after 2 years, it has never held a meeting. So far there is no high level official within NSC to coordinate these issues. I hope that by force of your testimony today we can learn what the Marine Corps and Navy are doing and lend your considerable weight to the effort of this committee and subcommittee to bring about what we believe to be necessary changes.

I look forward to hearing your comments and testimony.

Senator **Kennedy**. At this time, I would like to have Senator Dixon's opening statement inserted for the record.

Prepared Statement by Senator Alan J. Dixon

Mr. Chairman, I am pleased to be with you today to hear from Gen. Alfred M. Gray, Commandant of the Marine Corps.

Just recently I wrote to Deputy Secretary of Defense Taft urging him to carefully review the additional cuts that are called for by President Bush. I said in my letter that I felt that no further cuts should come at the expense of the Marine Corps or the Army in conventional areas.

Mr. Chairman, I look forward to hearing from General Gray on the status of the Marine Corps today and in the future.

Thank you, Mr. Chairman.

Senator **Kennedy**. General Gray, you may proceed.

STATEMENT OF GEN. ALFRED M. GRAY, USMC, COMMANDANT OF THE MARINE CORPS

General **Gray**. Thank you, Mr. Chairman and Senator Cohen, Senator McCain. Of course, it almost goes without saying that it is a great privilege to be here today and an honor to have an opportunity to share our views with you on these very important topics.

We have prepared a somewhat lengthy special posture statement for these hearings, which we would respectfully ask be entered into the record.

Senator **Kennedy**. It will be so included in its entirety.

General **Gray**. We also, as the three of you know, prepared a book entitled "Concepts and Issues" which in summary form depicts the logical train of thought with respect to our direction for the Marine Corps over the past few years and provides, I think in detail, the various actions that we have taken with respect to improving the Corps' preparedness for conflict across the entire spectrum.

In perhaps a brief summary of what we have tabled formally, we have said that if we intend to continue to deter conflict, be it nuclear war, or the so-called conventional global situation, or conflict in the developing Third World regions, we have got to maintain a strategic nuclear balance, and we need to have credible general purpose forces capable across the spectrum. I prefer to call such forces, general purpose forces as opposed to conventional forces, as is normally done.

As long as we can keep the strategic nuclear balance and as long as we can be credible across this specturm, particularly in the high and mid-intensity arena, then we should be able to deter a global type of conflict. Our experiences since the end of World War II point to that.

We have suggested that we have to remain strong with our alliances and our partners. Although these alliances are difficult sometimes to maintain on both sides of the Atlantic and the Pacific, in the end the democratic countries and the people who enjoy freedom or aspire to it seem to be able to pull together and make these alliances function for the good of peace.

That having been said, your Commandant does not believe that we will have a nuclear war, and he does not believe that we will have a global war with the Soviet Union with its centerpiece in Europe.

As a matter of point, I also do not believe that if it did occur that you could confine a war with the Soviet Union/Warsaw Pact to the European proper. You have to look at the global aspects. And the rationale would be quite simple. Senator, you used the term "competitive strategies" and, of course, the fundamental part of that is matching enduring strengths against enduring weaknesses and vulnerabilities. Many of our strengths are global in concept and global in being, and therefore we would have to apply these kinds of strengths in any kind of conflict with the Soviet Union/Warsaw Pact.

To my way of thinking, the most probable conflict that we face for the rest of this decade, the next, and into the next century, is in the Third World regions, the developing nations, the areas where, as we all know, conflict exists today, where we have had some 300 of these type of conflicts since the end of World War II. For every conflict that is going on today, whether it is advancing or regressing, there are twice as many potential flash points.

So in our conceptual framework, and if I could be so bold as to call it a model, we said a few years back that the nuclear balance will continue to be required. We must provide support for that balance, to include our strategic thought and our strategic input. That is another way of saying that the Commandant, in the hard choice arena, supports our nuclear balance, regardless of what we have to do to keep it.

When we look at the global conventional war type scenario within our current strategy and consider how it has evolved since World War II, fundamentally it has not seen that much change; that could be good, because we have not had a war in Europe. Maybe it is working.

We tend sometimes to continue to tell ourselves on both sides of the river that we do not have a strategy. And there are some kernels of truth there, I suppose, and some rich food for dialogue. We certainly do not have time to get into all that though.

Clearly we should continue to assess our strategy, and we are today. We are doing what the President has indicated in a number of his speeches. We are doing what Mr. Scowcroft, the National Security Advisor, and the Department of Defense and others have indicated. These assessments are going on now. The chairman is making an assessment of our global strategy and our regional strategy requirements. As clearly expressed in the Defense Reorganization Act, he is looking at the roles and missions and capabilities of all of the services, to include the Coast Guard, in order to meet the demands that we have in the global and regional plans of the unified commanders.

In a simple form of expression, we are trying like hell to do what everybody wants. And there are a lot of dedicated people trying to bring this about.

I think that we are on a short tether. There is no question that we are going to have to produce in the next 5 or 6 weeks, and the next 2 or 3 months, to meet the various milestones and deadlines that have been set upon us or that we have set ourselves. Clearly, there is concern within the administration, within the Congress, within the military, within the Department of State and within the intelligence community. So we all want to do this the best way that we know how.

I view our model as referred to earlier as considering type A and type B conflict. Type A would be the general war scenario or the mid- to high-intensity conflict; be it in Europe, in Northeast Asia, the Korean Peninsula, or all of them. In these regions we are dependent strategically upon airlift and sealift to rapidly reinforce our allies. We also depend upon pre-positioned stocks of equipment, supplies, infrastructure, host nation agreements for logistics and that type of thing, initially as an additional form of deterrence and should deterrence fail, then warfighting and, of course, winning.

Clearly, whether you talk in the Pacific with respect to the Korean Peninsula, or whether you talk to Europe, this requires a sound, powerful, flexible air power, to include that of our allies. It also includes a tough, prepared land army, not only ours but those of our allies. We strive within that framework to drive toward those goals.

One common denominator in both the Pacific and the Atlantic, however, and with respect to this type A model is naval power—air, surface, sub-surface, amphibious—my type warfare. Naval power means a balanced fleet, the striking fleet as we call it in NATO terms. A balanced fleet draws upon a kind of synergism and permits us to use the Pacific and the Atlantic. Clearly, there can be no credible deterrence nor any victory in Europe or in Northeast Asia if we cannot use the seas when we want to, where we want to, and to the degree essential to win. There is another part of that, too, and that is the need, as we all recognize, to use the seas for commerce.

This flexible kind of naval power is what many talk to in the realm of a maritime strategy, and is one that I prefer to call a sea power capability for a maritime nation. It is essential for deterrence, effective warfighting, protecting the sea lines of communications, using maritime power on the flanks of NATO and in the Northeast Asia strategic area of operations. Naval power is crucial if we are going to be credible or to win again.

So if we look at that and agree that we have to maintain credibility throughout these budget cycles that you have alluded to, Senator, then it would seem to me that we must demonstrate this credibility with regards to the most likely and most probable forms of conflict in the Third World regions that we know we are going to face. We refer to this more likely conflict as type B conflict. We are facing them right now. It seems to me that we must ensure that our general purpose forces are flexible. The idea of their maximum and aggregate usefulness to the Nation is our goal and is what we need.

We have come to the conclusion that in the type B conflict of our model, it is the sea services, the maritime forces, that have been used 81 percent of the time in the 300 conflicts I have alluded to. They are the ones that must be up on the step and aimed this way as well; because we offer the most immediate and prepared utility to the National Command Authorities.

So we in your Marine Corps have said we will be prepared for the entire spectrum of conflict. Our largest commitment at the high end of the spectrum requires two Marine expeditionary forces to go to Europe as the strategic and regional reserve. We will be fully prepared to meet any of the other 42 global or regional contingency plans that the various unified commanders have that we support. As you know, we support them all. That is the focus of our training, our education, and our efforts to modernize.

Our use of what we call applied technology is achieved when we know the technology works and when we know that it is not only technically feasible but financially feasible. Not all technology is, as we know. We drive toward that and we still have conducted our studies and developed our plans and looked at the world as we see it in the year 2010 through 2030.

We must, as you have indicated, look over the horizon. We must be prepared for the next century and the time to do the planning and thinking is now. What we have done in the past couple of years is improved the general purpose Navy-Marine team; this is the same force that is out there today on all the seas; and the same force that does in peacetime what it does in war. We have taken that force, honed it and improved it. We have greatly enhanced its capability for a wide spectrum of special operations and unconventional warfare type activity, and aimed that force at the lower end of the conflict spectrum.

I think it is the best way to go militarily, from the standpoint of flexibility for the National Command Authorities, because we do not need overflight rights which can restrict political decisions. We can stay at sea. We can maneuver. We do not need a large infrastructure ashore and in a developing country that is fraught with its own challenges and problems. We can lower or raise the threshold and the presence as needed. We can support our forces from the sea. We can structure and tailor military forces and military operations for the true military support role that is needed in any low intensity conflict strategy. We have to look at and adapt to all of the elements of national power—political, economic, military, and the social aspects of it.

There has to be a country team. There has to be a grand strategy or a theater strategy. It has to not only concern itself with a nation in many areas, but with a region; that is clearly the case when one talks about Nicaragua. We cannot talk about Nicaragua without talking about the regional aspects. So you are talking about, hopefully, a grand strategy that would solidify and emerge and that would have a whole series of subsets of strategies within it. The same strategy that would apply in Southeast Asia would not apply to the Mideast and neither would it be appropriate for the continent of Africa.

So that is what we have tried to do here, and I now await any questions. Oh, one further point I would make on the chart. We know about those kinds of charts. That is not a Marine chart; that is probably a national kind of chart, because we spend much more time below that line, as the Senator knows. [Laughter.]

This morning when I left, my wife said, why are you going over to testify? Your budget does not even show up in the pie charts. And I said, well, you have to go do what you have to do.

After World War I, we went through this down cycle in your Marine Corps, and again after World War II, Korea and Vietnam. The decade of the 1970s was particularly difficult for your Corps of Marines.

And you are, I think, precisely right. The thing to do, and what we are doing, is to turn on the brainpower. You turn it on full force during these low budget years because thinking, writing, studying, conducting seminars, reasoning things out, and looking to the future, costs very little, if any, money. So you prepare for the next cycle. That is what we did in the decade of the 1970s.

We had virtually no funding, negative growth, throughout that tough decade, but we continued to think. We studied conflict around the globe. We knew more about the Arab-Israeli War, for example, than most. We looked at all the weapons systems and emerging technologies and did a new long-range plan.

We used to send marine captains and gunnery sergeants to the meetings of the other services, and we would say go to those meetings to see what the hell they are talking about. When they get around to requirements, tell them what we need and then get out of there before they ask you to pay for it. [Laughter.]

And we did the documentation and every time they changed the way we developed operational requirements and the way we did that kind of thing, we rewrote it again. So when we got the first supplemental in 1980 and when we began to get some decent funding, we were able to move very quickly. So we have virtually modernized your Marine Corps as of this morning. The effort is not complete. It never will be.

We are very proud of your Corps of Marines today. We are very proud of the idea, the simple, subtle thought which I will probably come back to at the end if I get a chance to say any more, that we can meet our plans for global war, a conflict with the Soviet Union and the Warsaw Pact which we view on a global basis; and we can meet any of the other 42 regional or contingency plans of the unified commanders.

We can meet them this morning. We can do it for at least 60 days before we have to begin to concern ourselves about matters of sustainment, and we can do it without mobilizing a person. That is the highest level of peacetime preparedness that your Corps of Marines has ever enjoyed.

So we want to suggest that the Nation has always needed somebody to be ready and prepared. History has shown that the Nation has normally called on our Marines and expected readiness to be our forte. I would suggest that we are in a pretty good posture this morning to continue that effort for the rest of this century.

Thank you, Mr. Chairman.

[The prepared statement of General Gray follows:]

STATEMENT OF
GENERAL A. M. GRAY
UNITED STATES MARINE CORPS
COMMANDANT OF THE MARINE CORPS

Mr. Chairman, Members of the Committee,

You asked me to appear before you today to comment on changes I have instituted within the Marine Corps which will better prepare your Marines for special operations and low intensity conflict, and to discuss the interface between this program and the recently established Special Operations Command. You also expressed an interest in my views on recent developments in the ever-evolving U.S.-Soviet relationship. In this statement, I am pleased to respond to those focused interests and will gladly elaborate on them, and on any other topics you may wish to discuss, during my personal testimony before you.

Over the past several years, we have seen perceptions change with regard to threats to our national interests. The most significant changes, of course, have been a direct result of General Secretary Gorbachev's initiatives. No longer do the citizens of this country or those of our Allies perceive the Soviets to be as menacing as they were. Movement toward improved relations with the Soviets is good for this Nation and our allies, provided we realize that the basic objectives of the Soviet Union do not appear to have changed. I believe that General Secretary Gorbachev's desires for economic and political reforms in his country are genuine, and I am encouraged by the thrust of change that is taking place. We must remain vigilant, however, because I do not know whether or not his conciliatory approach reflects an enduring commitment to improved relations. Unlike his predecessors, General Secretary Gorbachev is a master at swaying public opinion and I am fearful that many are becoming mesmerized by his rhetoric.

Even with the perceived reduction in the threat of direct confrontation with the Soviets, it is prudent for the United States to proceed with caution. Our view of Soviet intentions must still be measured in terms of Soviet military capabilities. In this regard, I am convinced that vibrant US military strength and sound alliances remain key to maintaining US leverage for continued reductions in tensions. Arms control initiatives offer some promise of reducing the likelihood of a direct U.S.-Soviet conflict. In conducting these negotiations, we must have a desired end in mind that is linked to a our national strategy and foreign policy. In addition, arms control negotiations must be accomplished in coordination with our allies in order to maintain alliance solidarity. Long-term success will depend upon accurate verification. In order to maintain deterrence and to achieve success in these negotiations, we must continue to rely on a strong survivable nuclear force and credible conventional force levels. This requires the continued commitment to maintain strong air and land forces capable of responding to the defense of the NATO Alliance. In light of changing perceptions and fiscal constraints, this will take a lot of creative thought and ingenuity. For the foreseeable future, strong strategic nuclear forces will continue to provide the foundation for deterrence vis-a-vis the Soviet Union.

Although the threat posed by the Soviets is the most dangerous to our survival, we view it to be the least likely to result in hostilities. Mid-and Low-Intensity Conflict has been and will remain the most likely form of conflict for the United States. Third world threats to U.S. interests continue to emerge. We see the most likely threats to our security to be instability in Third

World countries to include insurgencies, terrorism (both transnational and state sponsored), drug trafficking (narco-terrorism), and rising nationalism. Of particular concern to me is the fact that these threats are compounded by the proliferation of high technology weapons including conventional long range weapons, weapons of mass destruction, and other sophisticated weapon systems, such as anti-air, anti-armor, and anti-ship guided munitions.

U.S. national interests in the developing areas of the world will remain and grow in their importance. As our interests in these regions increase so will the potential for involvement in Mid-to Low-Intensity Conflict increase. This requires that the U.S. have appropriate forces ready to meet these challenges head-on. The Presidential Commission for an Integrated Long-Term Strategy made a similar recommendation. Their report states that DoD "must give preference to more mobile and versatile forces - forces that can deter aggression by their ability to respond rapidly and discriminately to a wide range of attacks." I am convinced that Naval forces are particularly well-suited for such roles. Their worldwide reach and inherent strategic mobility, their ability to deploy and operate without the need for overflight rights and overseas basing, and their self-contained sustainability make these forces ideally suited for operations in an expeditionary environment. Characteristics unique to Naval forces are their ability to remain over the horizon and out of sight and their capability to disengage quickly. This provides the National Command Authorities with the flexibility to control escalation while maintaining a degree of stability in crisis situations. In short, while the global environment is subject to change, sea power remains an enduring constant in our national security strategy. It is and will continue to be America's strategic advantage and our adversaries realize it.

America has always recognized the need for and the utility of sea power. In this light, I am committed to the idea that Naval forces are the key to maintaining our economic health and security. Just as they have been for the past two centuries. This nation will continue in the 21st century to place a premium on forces capable of adapting to uncertain geopolitical and economic situations. Multi-mission capable forces, flexibly sized to the mission, possessing the characteristics of speed and mobility will have the greatest utility and, thus, the highest probability of future employment. Today, as in the past, your Marine Corps mission is to provide these forces. As envisioned by Congress, our ability to task organize an integrated air-ground force under a single commander appropriate to the situation, its intensity, and its duration is a unique quality of the Corps and our partners on the sea, the U.S. Navy. Based on this combined arms concept, Marine Corps doctrine provides that Fleet Marine Forces will be employed as integrated Marine Air-Ground Task Forces (MAGTFs). This operational concept of a tailored ready force exploits the combat power inherent in closely integrated air and ground operations.

As we head into the next century, the maritime power projection capability provided by this Nation's Navy and Marine Corps, in the form of our carrier task forces and naval expeditionary forces, will continue to be the most respected, most responsive, most flexible, and most prepared force that is capable of reacting immediately to the entire spectrum of conflict short of a nuclear engagement.

For the past 8 years the Marine Corps has focused on improving its capability to perform its legislated roles and missions. The key to our mission is the requirement to continually maintain a versatile expeditionary force in readiness, always combat ready, and capable of responding to crises without the need for mobilization. We are proud of the significant improvements which have been achieved in force modernization, readiness, and sustainability. In light of decreasing defense resources, your Marines realize the importance of prudent spending. We have focused our economies on reducing redundancy and streamlining our supporting establishment--not in reducing readiness and sustainability. Historically, the Marine Corps has been able to adapt to changing threat and budget environments because it has been able to identify, sometimes before these needs were realized or commonly accepted, the Nation's evolving strategic and tactical requirements.

With the aforementioned in mind, my predecessor and I initiated several fundamental changes to the focus of Marine Corps training with particular emphasis being placed at the individual and unit level. One purpose of these changes was to reemphasize and improve the Marine Corps' inherent expeditionary capabilities to respond to the unique demands of low-intensity conflict. However, I must emphasize that the effect of these training initiatives is not restricted to the lower level of conflict. They have also improved our effectiveness in Mid-to High-Intensity conflicts.

Early in my tenure as Commandant, we realized that a key to success in this area would be the standardization of training and education throughout the Corps. We had to think and fight as one Corps. A place was needed for training initiatives to be crystallized, thought about, tested and evaluated, and implemented. To accomplish this, a more effective means of managing training as a total system was required. Your Corps' solution was the establishment of the Marine Air-Ground Training and Education Center (MAGTEC) at Quantico. This was a conscious decision to ensure that there would be a direct link between training and education and warfighting requirements to include doctrine development and equipment acquisition. In general, MAGTEC is chartered to develop policies and programs for the training and education of all Marines.

Based on a perception that Marines in general were not being trained as well as they should be and that there was an erosion of the combat skills of our non-infantry Marines, the leadership of your Corps was convinced that corrective action was required. Again, we believed that a return to the basics was necessary - that every Marine must be trained as an infantryman. The need for this approach was dramatically brought home by recent studies which showed our rear echelon supporting units to be particularly vulnerable to guerilla action in Low-Intensity Conflict and to the tactics of potential adversaries which emphasize strikes against rear areas. Our solution was the Marine Battle Skills Training (MBST) program. Not a single training event, MBST is a comprehensive training process, dedicated to the development and sustainment of basic combat skills throughout our Marines' careers. It focuses on extensive firing of individual and crew-served weapons, basic knowledge of field skills, participation in rugged battle drills, and combat oriented physical conditioning. A pragmatic approach, MBST is organized into four progressive, mutually supporting stages which cover the spectrum of combat training:

- Stage I: Basic Warrior Training (BWT). Initially implemented at our two recruit depots in February 1988, BWT incorporates 2 weeks of training in aggressive, field-oriented combat tasks into the existing, albeit some what modified, recruit training curriculum.

- Stage II: Marine Combat Training (MCT). Under development since November 1987, MCT is an ambitious 28-day training package at the Schools of Infantry on each coast, one located at Camp Lejeune and the other at Camp Pendleton. MCT focuses on collective combat tasks, offensive combat skills, and familiarization with and firing of crew served weapons. We will fully implement this portion of MBST, on 1 June 1989.

- Stage III: Marine Leader Training (MLT). MLT encompasses our 17 locally established NCO basic courses and our 3 SNCO academies. The initial focus of MLT will be to provide our noncombat-arms NCOs and SNCOs with the combat leadership skills needed to lead Marines in battle without abandoning an appropriate level of attention to professional military education. When we reach the point where all our NCO and SNCO population has benefited from Stage I and II, we will upgrade MLT to an advanced course in combat leadership.

- Stage IV: Unit Sustainment Training (UST). Still in the concept and development stage, UST will translate BWT, MCT, and MLT into higher levels of combat readiness.

Improvement of the combat skills of non-infantry Marines is but one goal of MBST. Since all our Marines will receive training in basic infantry tasks, Marines destined to become infantrymen will enter their formal MOS training at a much higher level of knowledge and skill than before. This new breed of Marine infantrymen will be highly trained in light infantry skills, and will specialize in the conduct of raids (particularly amphibious raids) and strike missions from any platform. We have taken, other steps to improve our combat skills. We initiated an improved and more realistic combat marksmanship program, developed a standardized Marine Corps unique Close Combat Training program, and restructured our physical fitness and water survival programs to provide a rigorous combat orientation. As you can see, we have oriented all these programs toward ensuring our success in combat.

In 1985, the Marine Corps undertook a reemphasis and enhancement of traditional expeditionary capabilities of Fleet Marine Force units which would have utility across the spectrum of conflict. This reemphasis and enhancement created the Amphibious Ready Group (ARG)/Marine Expeditionary Unit (Special Operations Capable), or ARG/MEU (SOC). Today, your forward deployed Marine Corps MAGTFs embarked aboard amphibious shipping have an inherent capability to conduct selected maritime special operations, particularly when a requirement exists for the introduction of heliborne or surfaceborne forces from the sea. This program provides our warfighting CINCs, through the Fleet Commanders, an immediate response capability across a wide spectrum of contingencies via both conventional and maritime special operations. Specifically, your ARG/MEUs (SOC) are capable of performing these tasks:

- Amphibious Raids
- Security Operations
- Limited Objective Attacks
- Mobile Training Teams
- Noncombatant Evacuation Operations
- Show of Force Operations
- Reinforcement Operations
- Civic Actions
- Deception Operations
- Counterintelligence Operations
- Initial Terminal Guidance
- Sigint/Electronic Warfare
- Military Operations in Urban Terrain
- Clandestine Recovery Operations
- Specialized Demolition Operations

- Tactical Recovery of Aircraft and Personnel
- In-Extremis Hostage Rescue Operations
- Fire Support Control

The success of this program is predicated on each deploying ARG/MEU (SOC) attaining the highest possible level of performance. Prior to deployment, each MEU undergoes a three phase training program requiring the achievement of specific training standards during each phase. The standards are tough. Requiring the highest level of proficiency from each and every Marine assigned to the MAGTF - from the commander to the individual rifleman. For example, the ARG/MEU (SOC) must be capable of launching a rifle company of Marines, on short notice, at night, in adverse weather, under EMCON (radio silence) from an extended range. By short notice, we mean that the raiding force must be capable of departing its seaborne platform within six hours of receiving the notification order. While deployed, the ARG/MEU (SOC) will exercise/train to maintain the proficiency achieved during their predeployment training. Tremendous benefits have been realized from this program. In discussing these enhancements with you, I would like to stress that these individual and unit training improvements are not limited to our MEU sized units. All deployable MAGTFs are special operations capable.

As you well know, Low-Intensity Conflict is an environment in which both special operation and conventional forces may operate. The terms special operations and Low-Intensity Conflict should not be used interchangeably. Historically, the Marine Corps has performed selected special operation missions across the spectrum of conflict with significant emphasis being placed on small and revolutionary type wars. For example, in the 1930s the Marine Corps recognized that Low-Intensity Conflict was a non-traditional type of warfare and published the Small Wars Manual. This manual, based on experience gained in this type of conflict in the 1920s and 1930s, has proven to have applicability today. Accordingly, it has been republished for our young leaders to study. I am fully confident in the capability of all MAGTFs to perform tasks within all four military missions associated with low-intensity conflict(Insurgency/Counterinsurgency,Combating Terrorism, Peacekeeping Operations and Peacetime Contingency Operations).

As mentioned in your invitation, recent legislation created the U.S. Special Operations Command and gave its Commander-in-Chief the responsibility to coordinate the training and requirements for assigned special operation forces. Recognizing, the responsibility which USSOCOM has in preparing special operations forces to carry out assigned missions, Marine Corps operating forces cooperate and interface with them on a routine basis. Marines are assigned to the staff of USCINCSOC and his subordinate commands. Marines participate in USSOCOM's formal schools both as students and instructors. Our operating forces conduct predeployment training together, most notable are the workups conducted prior to deployment as an ARG/MEU (SOC). During recent contingency operations in the Persian Gulf, we worked closely with U.S Navy SEALS and U.S. Army SOF aviation elements. Our relationship is positive and productive. In short, the Marine Corps works to complement, not compete with, designated special operations forces.

In summary, Mr. Chairman as we move into the 21st century, a changing security environment and fiscal realities will require some hard decisions. I ask that as you make these decisions, you keep in mind that the ultimate utility of Fleet Marine Forces is in their readiness to meet the nation's security needs today and in the future. Readiness will remain the key to our success and readiness is the foundation on which we must structure, train, equip and deploy our MAGTFs. Always remember that the strength of your Corps lies in its versatility and readiness. We aren't tied to a single form of conflict or single form of strategic mobility or geographic area or mode of assault. Our forces are unique in their flexibility to perform a whole host of missions under a whole host of circumstances. In short, your Marine Corps remains this Nation's expeditionary force in readiness capable of responding to a range of crises, today, without mobilization. As always your Marines stand ready to meet the challenge facing this great Nation, now and in the future.

Senator KENNEDY. Thank you very much, General.

We want to welcome Senator Dixon to our subcommittee. This is the first meeting he has attended. He has been, as all of us know, extremely active and involved in the full committee and much concerned about the whole range of issues that we will be focusing on not only today but in the committee. And, as always, we are glad to have Senator Glenn. Although not a member of the subcommittee, he takes a very special interest in Marine Corps issues. We hope that he will participate in whatever way you would like in terms of questions or any other involvement.

Senator GLENN. Thank you, Mr. Chairman.

Senator KENNEDY. I suppose we will do a 10-minute rule and I will ask the clerk to watch the time.

DUPLICATION OF CAPABILITIES

General, you outlined the additional kinds of capability in the development of the marines and meeting of the special operation challenges, the MEU SOC concept. Just briefly, if you could tell how those capabilities are different from the traditional Marine Corps capabilities. I would be interested in that, number one.

And then, second, how you tie those capabilities into the special operations forces under the Special Operations Command, how the National Command knows of that capability and what thinking you have had in terms of ensuring that we are not going to have duplication of capability.

If you could take them from the beginning, how is it different, number one, and then how do you tie into the special operations forces and does the National Command really know this capability?

General GRAY. What we did in the early 1980s is not unlike what we did under President Kennedy in the early 1960s. He said to us that we looked pretty good in the nuclear arena and we looked like we had pretty good conventional forces in 1961. But it seemed that we were not very well prepared for these brush fire wars, guerrilla, counter insurgency and the like.

As required by the Secretary of Defense, we took a hard look, at our capabilities and our ability to do more in this area. There are three things that could have been done—nothing, create an elaborate special force, or take the forces you had and make them better. We did not want to duplicate capabilities. You do not need another special force organization per se, in my judgment, for all the right reasons. And there is only so much of a capability you can have in special forces and the whole world of unconventional warfare, again for all the right reasons. So we opted to capitalize on what we do best, which is being forward-deployed and coming from the sea. We took our conventional or general purpose capability and fine-tuned it, if you will. We made sure that everybody understands that we can do a wide spectrum of operations, which many people call special. Much of this is a matter of semantics. We have made it known that we can make our contribution and that it is complementary in nature. We were adamant about that. We did not want to duplicate. That would not be fair to the taxpayer.

So we took a look at our doctrine, our capabilities and our tactics, and we homed in on the amphibious raid, which is part of amphibious warfare. We said if you can do an amphibious raid at night from over-the-horizon in marginal weather and commence that raid within 6 hours of being given the mission, you would be able to do 95 percent of whatever may come your way, in whatever type of low-intensity or unconventional type conflict, bar none.

We set about to make that happen. We strengthened our forward-deployed forces with additional intelligence and reconnaissance; that is fundamental. It should be the top priority of any organization or study group that wants to get better in low-intensity conflict and in this entire area. We added reconnaissance personnel who were also trained in signals intelligence and electronic warfare and linguist teams. We added explosive ordnance personnel. We added equipment that we took out of our own hide. We have not used one nickel of the so-called Program 11 money for special forces and the like. We added backpack satellite radios and backpack intercept type equipment. We put mounts and special antennas on amphibious ships and we created an all-source fusion center in Rota, Spain, and in the Pacific, aimed at the kind of information that you need in these regions. We put some hand-picked marines in these places and elsewhere throughout the intelligence community. We added an air-naval gunfire liaison unit to strengthen our capability to work with our allies; these are the people that use our air and our naval gunfire and that type of thing. We added a Stingray light air defense capability. We strengthened the counterintelligence part of this organization.

And we gave them the capability for 17 other special type missions under this umbrella in addition to amphibious warfare, ranging from special purpose attack, a limited objective raid, mobile training team assistance, civil affairs assistance, special intelligence or clandestine collection, et cetera. Of course, as always, we must be prepared to evacuate American and other civilians, if required, in troubled spots. We intensified our efforts to be able to do this in a hostile type environment, as opposed to a permissive type environment.

We were pretty good going in, and we are darn good now. One of the reasons is, we got a lot of support from the other services, and that gets me to the next point. We got a lot of help from the Army, from the Air Force, and obviously we benefitted from being a part of the Navy-Marine team. We exchanged instructors and ideas. We developed standards even before you created the Special Operations Command.

As I believe you know, their current commander in chief, Jim Lindsay, and I go way back professionally and personally. He commanded the 18th Airborne Corps when I commanded the Atlantic and European Marines, and the Second Marine Expeditionary Force. We already developed the fourth iteration of an operational doctrinal publication that would help us avoid many of the problems and issues, perceived and otherwise, that we had in operations like Grenada.

So we have been operating in this kind of environment together for a long time. We have had joint operations together with the Special Operations Command, to include that element that we know as the National Counterterrorist Force organization; not just in the United States but overseas. We use part of their people on our evaluations; the forces are rigidly evaluated before they go. If they do not pass, they are not given this designator. If they do not pass a second time, they get another commander.

So the stakes are high here. You cannot and must not, ever advertise a capability if you cannot back it up. So you are seeing the fruition of a 4-year effort. The forces that you were with in the gulf were a modified version of that, as you know. This morning they are in the eastern Mediterranean and in the China Sea. I just finished the evaluation in Okinawa last month. All three of these Marine Expeditionary Forces now have this expanded capability. Again, they complement the forces that are available in the Special Operations Command or in any other allied special force or similar type unit.

They have mastered one final task; the one that sometimes raises some eyebrows. But, as you know, we are all required to have an in extremis prisoner or hostage rescue capability in the operating forces, and we have a very fine one. It is made up of our Marine maritime special purpose force. It is built upon a reinforced rifle company and includes our specially-selected parachute-scuba reconnaissance personnel; our parachute and swimmer intelligence personnel; our fully-equipped night vision operable helicopter squadron and others. It is trained to the full standards of this type of operation. Again, we use people from the national capability to evaluate that force, as well as people from all of the intelligence agencies and the Department of State.

Hopefully, you will get a chance to visit that force. If you do, you are going to like what you see. You are going to like the spirit. You are going to like the capability. You are going to like the pride. You are going to like the teamwork that is obvious amongst all of the military services. We think that we have done something here that is good for the country.

We have notified all of the unified commanders and the people throughout the National Command Authorities of our capabilities in this area. We train at 102 sites on both sides of the Mississippi, that are not on military reservations.

SPECIAL OPERATIONS COMMAND

Senator KENNEDY. Are you satisfied that the Special Operations Command has a full understanding of both your capability? Are you satisfied that the Joint Chiefs of Staff do as well? Finally, are you satisfied that you are not going to be asked to do something that you are not prepared to do?

General GRAY. No, we should not. As we know, though, this is a constant education process, even amongst the Joint Chiefs of Staff and unified commanders. Additionally, your Commandant is about to release the same kind of messages that he released when he was in charge of this program in Norfolk 2 years ago. Once again we are telling everybody what our capabilities are, what we can do and what we cannot do. Special briefing teams have already been into some of the unified commands. I am confident that any professional worthy of that title in the military today clearly understands what we can do. Those who do not are not professionals.

Senator KENNEDY. Senator Cohen.

NATO STRATEGY

Senator COHEN. Thank you. General, you indicated in your opening statement that many people feel we do not have a strategy in NATO, and you in fact contradicted that and I agree with you.

The problem is not that we do not have a strategy within NATO to deal with the Soviet Union; it is that we do not have a strategy to deal with what you have characterized more or less as Gorby-fever. We have not put together a response to deal with the kind of initiatives he has surfaced.

I might point out that this is rather ironic. We have erected all sorts of expensive measures to prevent Soviet espionage of our technology, and yet we have Soviet penetration of our ideas. These initiatives coming from Gorbachev are not new ideas. They are not old ideas. They are our ideas. That is the irony involved. We are the ones who called for the zero-zero option. We are the ones who called for disproportionate reductions on their side. We are the ones who have submitted to the Chemical Weapons Treaty.

We are the ones who have proposed these initiatives, and yet he is claiming them as his own and the Soviet Union is emerging as a leader in the field of trying to reduce tensions between East and West. Suddenly the West is paralyzed by these bold new initiatives that happened to originate with the United States. So I think we need a strategy to deal with our own ideas that are being snapped from our grasp.

Let me ask you quickly whether or not the NSC has solicited your views concerning low intensity conflict and the changes that have to be adapted to meet the rising threat.

General GRAY. I have had a meeting over in my mess over lunch with the newly-appointed member of the National Security Council who has cognizance of this, Mr. Miller. Of course my people at all levels have an opportunity to participate in this endeavor. I would personally welcome this opportunity in the very near future. I think it will happen in the very near future as well.

LOW INTENSITY CONFLICT

Senator **Cohen**. General, I would like to read some highlights from the letter that you sent to me dated March 8.

"The most significant low intensity conflict concerns are inadequate security assistance and the lack of civil military doctrine." You go on to state that "U.S. industry is concentrating on high technology items and cannot supply the required items. Assisting friendly governments to combat the military threat is but one element of a comprehensive low intensity conflict strategy. There is currently no civil military doctrine for executing a low intensity campaign."

You go on to talk about the NSC Board for Low Intensity Conflict as, "the vehicle to provide national level coordination." In your letter, however, you suggest that because this Board is so high level there is a tendency for it not to meet. Issues do not rise up to that level. And you suggest perhaps having a lower sub-level board to deal with these issues.

The problem with that is it seems to me we have tried to force the issues up to the highest level because we believe, as you and as General Gorman believe, that the Army's own report was correct in saying: "As a nation, we do not understand low intensity conflict. We respond without unity or effort. We execute our activities poorly. We lack the ability to sustain operations." That is the Army report.

I am somewhat intimidated to ask you whether you agree with the Army on this one, but I assume that you do. So we have sort of an across-the-board unanimity that we do not really have an understanding of what is involved. So we tried to kick it up to the very highest level in NSC. You say because it is so high it does not operate.

What we want to know is, if we go down to a lower level where is the clout to make changes that correspond to the way in which the threat is changing? What is the tradeoff here and how do we benefit from going to a sub-level board?

Maybe we ought to keep it at the Board and have a working group within that Board, but it seems to me we have got to keep it at the very highest level because over the years, that chart being an indication of where the Marine Corps has been, you can appreciate the resistance that this committee has met with in terms of even creating the changes dealing with special forces, low intensity conflict, you have got to appreciate that it is well below the lines up there.

So we are trying to get it above the line. We want to get the Marine Corps above the line, and it seems to me that what we have had so far is outright resistance to the notion of creating and setting up this Board. And once the Board is mandated by legislation, then it does not meet.

So tell me what you think about the tradeoffs on that.

General **Gray**. What I would like to do is ask your permission to give you a thoughtful answer on that very quickly. You have now given me the opportunity to answer that question, and I will start tomorrow morning with my analysis at Camp David. I will get back pretty quick because now you have asked a service Chief to give you a candid view on how we ought to do this.

I have not been asked that yet. Now I have, and so I have to respond. So if you would let me do it that way.

[The information follows:]

The points that the committee brings out regarding the requirement and placement of a "Board for LIC" are valid concerns and require thoughtful consideration. The National Defense Authorization Act for Fiscal Year 1987 amended Section 101 of the National Security Act of 1947 (50 U.S.C. 402) by adding "The President shall establish within the National Security Council a board to be known as the Board for Low Intensity Conflict. The principal function of the board shall be to coordinate the policies of the United States for Low Intensity Conflict." The intent of Congress in mandating the establishment of a "Board for LIC" would seem to be ensuring that the LIC policies of the USG are coordinated at the highest levels of the Executive Branch. NSDD 277, among other things, created a Cabinet level "Board for LIC", chaired by the National Security Advisor.

To date, no LIC issues have arisen or been identified for resolution at the Cabinet level by the "Board for LIC". Members of Congress have expressed concern that the "Board for LIC" has not performed the role envisioned in legislation. It has been proposed, most notably by Gen. Colin Powell, that the "Board for LIC" should be recast at the sub-Cabinet level as an NSC Deputies Committee.

The re-casting of the "Board for LIC" at a sub-Cabinet level would allow: First, the vast majority of LIC issues that require interagency resolution or coordination, but are not of sufficient criticality to warrant Cabinet level attention, to be acted upon in an authoritative manner by the NSC Deputies Committee. Second, those LIC issues requiring Cabinet level attention to be identified and referred to the NSC Principals Committee (NSC/PC) for resolution. Third, the establishment of a LIC organization that parallels other existing NSC organizations (e.g., the Policy Review Group) rather than tasking the members of the NSC/PC with additional committee responsibilities and can be established with current assets. Finally, re-casting at a sub-Cabinet level in the NSC would satisfy the congressional intent specified in the National Defense Authorization Act for Fiscal Year 1987.

The NSC "Board for LIC" is the vehicle to provide national level coordination. The board, however, is currently at a Cabinet-level, chaired by the National Security Advisor and the vast majority of issues that need resolution never reach this level. It seems advantageous that the board be re-cast at a sub-Cabinet level in the NSC that can act authoritatively on most issues and identify those critical issues requiring resolution by the NSC/PC.

Senator COHEN. General, that is fine. It also sounds very familiar. We have been there before. We have gone through this in the Intelligence Committee. Senator Glenn is on that committee now. If you do not ask the right question, you never get the right answer. Now we are put in a position that we have got to ask for it and put you on the spot to go forward.

General GRAY. I do not mean it that way. What I am saying is that you are dealing with a topic, as we all know, that requires not just the Department of Defense and the military, but certainly the Department of State, the Intelligence agencies and others. So you immediately drive it to the interagency type process. Again, at what level should this be?

What I am suggesting here is that I have made my views known. Sometimes they get accepted and, sometimes they do not: as is the life of anybody inside the Beltway. Now, though, I have a chance to sign what I have in mind and that is what I mean by that.

LANGUAGE TRAINING

Senator COHEN. A couple of other quick points. I notice in your written testimony on page 11 you listed a number of things that you are really concentrating on within the Marine Corps—basic combat skills and so forth. What did not appear here but did appear in your response to Senator Kennedy, when you mentioned language training.

General GRAY. Yes, sir.

Senator COHEN. It seems to me that that is also critical. If we are talking about winning political wars as opposed to military wars at the low level of conflict, it seems to me that language and philosophy are critical in putting people into a situation such as the Philippines. Now the Filipinos are experiencing a situation where the Communist insurgents are taking over the countryside.

Our doctrine, tactics, training and so forth are not prepared, not adequate to deal with what is going on out in the field; staying out there, understanding the language, understanding the culture and how to win the hearts and minds of the people in the rural countryside. That is where we are losing the political war. So I think that language is terribly important.

A final point. I guess my time is going to be running out here. General Gorman, when he testified before the committee in 1987, placed a great deal of emphasis upon having an appropriate level and type of intelligence, and he said, "intelligence is the key to irregular warfare. We have to change perhaps the ways in which we collect, analyze, and disseminate intelligence to make it more relevant to the unconventional arena."

THIRD WORLD SITUATIONS

I have about three questions. Number one, I assume you agree with General Gorman's statement. But how do we make it more pertinent to irregular or unconventional warfare and what has the Marine Corps done to try to make intelligence collection, dissemination, and analysis more pertinent to these Third World situations?

General GRAY. At the national level, you must redirect some of the national assets toward these regions and you must do it in such a way, in my view, that it provides more useful tactical type intelligence, as opposed to what may be viewed as theater or strategic type information. This kind of intelligence and the kind of combat information, if you will, can be applied, be it in the political, the economic, or the military support role. It transcends all of that.

You know, low intensity conflict is a term that I do not like. To me, it is revolutionary warfare. You are either trying to make a revolution or stop one, like we are in many places around the world. There are two fundamental rules here. One, you never make any more enemies than you already have; and, two, you do not ever do anything that is not good for the people.

Until you can hammer into the minds of the civilians and the military these kind of topics, you are not going to begin to get the kind of comprehensive effort that you are looking for. Now, I will say that the Defense Intelligence Agency has made some marked improvements here already in this area. There is more that has to be done, and there are, as we say in the field, no free lunches.

We have to remember that when you add here, you draw down there, unless somebody fuels the pot in a different way. So it has to be balanced against the need of technological assets, intelligence and the like, to maintain the nuclear balance and the other forms that we talked about.

Now what we have done is very similar to what we did in 1961 after then-President Kennedy's call to get hot on matters of insurgency and counterinsurgency. We looked at all the contingency plans and all the likely trouble spots. We went to the encyclopedia to see what languages were spoken in those countries. We then went to the national intelligence community to see what it looked like from the military and other standpoints. We went to other agencies to find out what languages were used in military thought, writing, communications, et cetera.

And then we built a plan. We started in the end of 1961 and the plan said, roughly, we ought to have about 100 Russian linguists and about 100 Chinese. Then, we took a whack at it. We also said we needed 60 Vietnamese, 60 Spanish and so on right on down to 8 Portuguese. We had them for the whole world. We were covered, if you will, in our plan.

When Vietnam began to expand in the spring of 1965 we had 72 fully-qualified and cleared Vietnamese linguists on desk, ready to go. So that is the kind of thinking that has to go on and that is what we are doing now. We have increased our quotas. But, it is more than that. It is not just the linguist skills alone. You have got to get people in these regions.

They have got to live in these countries. They have got to get the feel for the countryside, the culture and the people. Above all, they have got to like the people. If you cannot bring yourself to like them, understand them and want to help them, in the long run you are going to fail. So it takes a comprehensive program.

We now have increased our exchange options. For example, I have them in some 10 countries now. We are increasing observers when we can. We are working through the embassies and consuls around the globe. As you know, we have marines in 127 countries this morning and in all time zones, and they are learning more about these particular regions now. We are requiring them to do their homework, think about these things, and then ultimately report back to us. They are on the frontiers of democracy, many of these young security guards. It takes a comprehensive effort. It has got to be driven from the top, in our case by your Commandant and, as you point out, we need to make these things happen.

I am very familiar with General Gorman's thoughts on all of this. We confer every 5 or 6 weeks, and we are going to meet again next week. We go way back together. I used to fight with him all the time on his view of the need to reorganize JCS. I was on the other side of that. But, he is a great professional. What he had to say about the need for intelligence and about using all the elements of power is in my view the approach that has to be taken.

Senator COHEN. Thank you, General.

Senator KENNEDY. Thank you very much. We will continue the questioning from the members of the committee and then recognize Senator Glenn.

Senator McCain.

Senator McCAIN. Thank you, Mr. Chairman.

SHIFTING PRIORITIES

General Gray, would you accept the broad thesis, that at least for the short term, our priorities in regards to likely war scenarios have dramatically shifted from the Warsaw Pact/NATO scenario to the low-intensity conflict scenario?

General GRAY. Well, in a broader sense it is my view that the leadership of the Soviet Union is sincere about seeking change. I believe that is their intention right now, because it is in their best interests, perhaps their only interests. I think they have lost the cold war economically. I think their economy is in chaos. In fact, again, my own view is that they are a superpower primarily in the military sense, to include the progress they have made in space.

But, intentions are one thing and reality and capabilities are another. We have to be mindful of their enormous capabilities. They certainly have not slowed down one iota in terms of turning out aircraft, submarines, tanks, artillery weapons. They continue to modernize their capability, the Warsaw Pact's and, probably most importantly here, the capability of nations in many of the Third World regions, where the subject conflict occurs.

There has been no change in their ideology and they will tell you that. When we met with the senior Russian military leaders, they made that very clear. As you know, they visited last summer. We were first on the list, as you perhaps might expect. They went to Camp Lejeune. They saw an air-ground logistic training operation. They were really impressed by that.

I cannot tell you how many times they indicated that to us. They were impressed with the other military services as well. They were impressed with the combat information center aboard the carrier *Roosevelt*. They were impressed with what our soldiers did at Ft. Hood. They were impressed with what they saw at the Air Force installations.

In the first visit down there, it was the teamwork, the cohesion and the equipment that impressed the Soviets. The AV-8B, for example, they could not believe it. Even though they have all the intelligence on it, the capability, and even have that type of aircraft, they really were impressed with that.

But the biggest impressions of all, by far, were made by the people, the young marines that they talked to. I think this is very germane to the whole topic of low intensity conflict, as well. It was the people that really set them back. With Marshal Akhromeyev, I stayed back about 10 yards or so because I had an Atlantic commander down there and Bill Crowe was there. But, he came back several times to me and said, you know, your people are better than ours.

I said, well, I can tell you how to fix that. Get rid of most of yours and get smaller. He just kind of smiled. But, the point I want to make here, is that he would say, "if I had asked questions like this to my Soviet or Warsaw Pact soldiers, they would not answer. They would look at their feet. You can tell your people have grown up in a democratic environment." Now these are all advantages which we can play here in this conflict that we are talking about.

I began to wonder what my people were saying, so I went up to one corporal, and I said, have you been talking to these generals?

"Yes, sir." I said, what did they ask you? Well, he said, they asked me why I thought the senior Soviet military leadership was here visiting the marines and what did I think about that.

So I again was concerned. I said, "what the hell did you tell him?" And the corporal said, "I told him I do not know why you are here, but it is probably a pretty good idea." I think in many ways the corporal has captured what ought to be the contemporary strategy and thought about the Soviet Union.

We are not sure what they are up to. I am not. We have some ideas and we will have more. But, it seems to be a pretty good idea to have a dialogue with a potential adversary that is powerful enough to eliminate mankind as we know it today. So, that has to be a cornerstone of whatever we do when we talk about the rest of the spectrum of conflict.

The Soviet adventurism, even though it may appear that they are pulling out of Afghanistan and perhaps Angola and the like, is still there. They know that we have to have free trade and stability in the Third World regions, and they are much smarter today than they were 3, 4 or 5 years ago about this.

We tend sometimes to credit them too much for knowing a lot about the Third World type of conflict, and how they can intervene. But, every time there is an opportunity for instability, they are going to be interested in furthering it, in my view; that is in their best interests.

So we have to be prepared for that. I would also argue, as Paul Gorman goes from time to time——

Senator McCAIN. General, I appreciate your very detailed explanation, however, I am only allowed 10 minutes for questioning.

General GRAY. Let me just try to answer everything you asked me then, Senator McCain, for the record in writing. It is tough for me to answer your questions verbally.

Senator McCAIN. Thank you. General, I appreciate your detailed response. My impression of what you are saying is that at least some of our attention must be focused on the low intensity conflict arena, and that perhaps the likelihood of an immediate contingency in the Warsaw Pact/NATO area is lessened for a variety of reasons, including that which you just described. Would you agree with that?

General GRAY. Certainly. Yes, sir.

Senator McCAIN. Do you think that the budgetary planning as you have viewed it takes into account this shift in emphasis that we are undergoing?

General GRAY. I think in the general sense it has attempted to do that. As you well know, we are in somewhat of a state of flux yet on the budget planning. We have one budget over here, another being developed now and amended, and the military departments have submitted theirs. I have not seen, for example, the efforts of the other two military departments. I know what is in the Department of the Navy.

There is an effort to try to do this. Whether it is good enough, or whether I think it is appropriate and all, is too soon for me to tell you yet. I would be glad to try to answer that. The CINCs are commenting now and so are the unified commanders. We have not had a Defense Resource Board meeting yet. We will have to see how that goes.

NATO DISMANTLEMENT

Senator McCain. Thank you. General, I do not believe that we should somehow begin dismantling NATO, although, as we have seen reported by the media, some of my colleagues in the other body would like to begin removing forces from Western Europe. At the same time, as my colleague from Maine pointed out, there are serious trouble spots throughout the world that demand our immediate attention, whether they be in the pre-combat stage, or the advanced stages of revolution.

I would hope that our massive bureaucracy and our enormous planning process would take into consideration these changing and shifting scenarios. I thank you for your very important testimony. I would like to conclude by saying that we all appreciate the very outstanding job that you are doing for both the Marine Corps and the Nation and we look forward to future visits from you, even if you do not.

MV-22

In conclusion, could you tell me how disturbed, or how concerned you are about the possibility of cancellation or severe delay of the MV-22? I have heard it reported that it is behind schedule, and suffers from severe performance problems.

General Gray. Well, the MV-22, as you know, is crucial to our capabilities for the future because we have to be able to come from over-the-horizon, and the reason there has three letters, PGM—precision-guided munitions. The first leg, the aircraft air cushion is in the field. The second leg, the MV-22, is really in pretty doggone good shape, or at least it is the way I want it today. I would like to have everything better and faster, but it is what your Commandant has recommended. The third part of that triad, if you will, is the advanced assault amphibian that we are developing for use at the turn of the century.

Now the MV-22 is again on the frontier of applied technology. I think everybody that has really thought this capability through supports the program. Certainly the budgetary actions to date do. What has been talked about as a delay, a major slip, and even some ridiculous talk in some of the newspapers and the like, simply is not accurate.

We found out in January that aircraft 2, 3, 4, 5 and 6 apparently had slipped a couple months, and, as you know, we have not flown it yet. I am very anxious to see it fly, but I want it done safely and properly. I was personally concerned because with that 2-month slip of those other aircraft, that pushes us up against the Phase 3AB, the limited production buy decisions in our master plan. I did not want to see that done without proper testing.

I am also part of the culprit because I am really leaning on everybody—industry, the system, the Navy, everybody. I want that airplane to be able to operate the next day after we get it. As you well know from you experience, that is a bit different than the way other people build other aircraft. This is important to me, and I want it done right.

So, this has put some pressure, on industry and elsewhere. What I have recommended is that we exercise our option in the contract that we have, which permits us to slow this program down somewhat. It provides a considerable amount of money that we can save in 1990, as a nation, or allocate in other ways. It gives us a much sounder approach. It delays the initial entry of the airplane into service by only a few months at most, and maybe not at all. It obviously delays the final equipping of the final squadron in the outyears a little bit.

When we get it, though it will be ready to go. The severe problems that you allude to have been reduced now to be very minor. They have been about 80-85 percent fixed in the major areas with respect to physics. Part of that was contractor problems. Sometimes we have to live with that.

I am as confident of this airplane today as I have ever been. It is going to be the real wave of the future. It has increased requirements not only for the Navy-Marine team but for the Special Operations Command. If pressed this morning my estimate would be over the life of the program, with this new approach, we should save in the neighborhood of $230 million. So this is really a concept that we have tabled. We believe it is right. We believe it is in the best interests of the country, the taxpayer and your Marine Corps, in terms of what our operational requirements are.

Senator McCAIN. Thank you, Mr. Chairman.

Senator KENNEDY. Senator Exon.

Senator EXON. Mr. Chairman, thank you very much. General, welcome here. We are always glad to have you and I salute you once again for the great job that you and your organization do.

I say that because some of us who have the great advantage of serving with and listening to our good friend from Ohio, Senator Glenn, might get the distinct impression that the Marine Corps went away when he left it. So we are glad to see that the Marine Corps is still live.

ROLE OF THE RESERVE

Let me ask a question about the role of the Reserve, which I know you are keenly interested. You previously advocated a very large role for the Reserves and a greater integration of the Reserves with the regular forces. What are you doing to implement this strategy and if this strategy is implemented is there any chance that there might be a degrading of the readiness? How will special operations for the Marines be affected?

General GRAY. If I may, I would like to give a more detailed answer of everything we have done because there have been a number of initiatives over time. But, for purposes here, Senator, we have continued our efforts to make the total force that we need in the Marine Corps, as effective as possible. We are different from the other services. As you know, we do not have a Guard and Reserve type arrangement. For example, we do not have the same type of Reserve structure as our brethren in the Navy.

We have a Selected Marine Corps Reserve of about 44,000 people that is organized, trained and equipped to come on active duty; if you are a ground marine, within 30 days, and an aviation marine within 7 days, you would be expected to fight. They know where they are going and what they are supposed to do. They are integrated with their active force counterparts.

We have basically said that if it cannot get to war in 60 days, whether it is a shipping constraint, a heavy equipment constraint, or perhaps because we just will not need it until a little later then it goes in the Reserves. Basically, that is what we have done. So, we have leaned up the active duty force and aimed it toward the lower end of the conflict spectrum.

We have already 47 percent of our armor in the Reserves. We have moved some of the heavy, really technically medium, artillery and the self-propelled artillery. We have increased the overall readiness of the Reserves with some better aircraft and we have added to it additional Stinger teams, for rapid reinforcement of the active establishment, should it be needed.

So these are all measured steps to make our Reserve structure even better yet. Many of our Reserves possess the unique talents that are vital to special operations. Many of them are in the intelligence community in civilian life. Many of them are pilots, that type of thing. Many are linguists.

We tap that knowledge. We have Reserves on our standing special operations capable board, for example. So we have integrated that and our focus on these areas takes place at Quantico in the warfighting center. So we think that we are on target with what you and the others have in mind here, sir.

Senator EXON. Thank you very much, General.

You have repeatedly stated that the Marines are committed to having a well-trained and certainly quality-led force, and you have demonstrated that by your insistence that regardless of the skills of the various branches of the corps all marines must all be trained in basic warfighting skills.

DECREASING MARINE CORPS O&M OUTLAYS

Now with that rationale what was the thinking behind President Reagan's fiscal year 1990 budget proposal that would have decreased the Marine Corps' operations and maintenance outlays which pay for such training by over 6 percent while the other services' O&M accounts were increased. That is one of the factors that I could not understand. I assume you did not agree to that.

General GRAY. No, I do not agree with that, but it becomes an affordability issue for us. In order to continue to give you the Nation's premier maritime expeditionary forces in preparedness we have to be manpower intensive. As you know, we are far more manpower, foxhole, intensive than our counterparts—65 percent as opposed to the next closest service, the Army, at 38 percent.

So when we get these percentage type cuts, which seem to be the way we continue to at least consider doing business, that hurts your Marine Corps. If you did an historical analysis over time, I think it would come out that we have probably been underfunded for most of our existence in these areas. So, when you look at what must be done to protect your ability to maintain the force structure needed to be fully prepared in the global arena, and your procurement account has really only one high dollar item in it, the new M1-A1 tank, you have to begin to trim back, as we have done.

Clearly your Marine Corps needs more operations and maintenance funding in this budget; both the one that you are looking at, and whatever comes over here in the next couple weeks. I certainly intend to fight for that; but, I also have to have a balance. We have to be able to sustain ourselves. We have to be able to be fully prepared to do the right kind of training, and have the kind of education that we need.

Senator EXON. Thank you, General.

RECRUITMENT AND RESERVE STATUS

One last quick question. I assume that the recruitment in the corps is alive and well and you are satisfied with it. If that assumption is right, how about the Reserves? Are you having any difficulty there?

General GRAY. No, sir. We are pleased with our total force recruiting efforts as they stand today. We, like the other services, are concerned downstream, as you well know, with the demographic changes. We are prepared, of course, to deal with that.

I have made the recruiting harder for my young recruiters, though, by going to what I call a level input recruiting system; about the same number of people coming in each month, as will go out 3, 4 or 6 years later. That is tough for them, and there is a little front-end cost to that. But, the benefits over the long haul are enormous; the cohesion, the stability, the shrinking down of the training pipeline. All of that will be enormously beneficial for us. We are doing that. You will not see these high marks in the summer and then low during the winter. It is going to be difficult for them, but they will do it.

Senator EXON. Thank you very much, General. Thank you, Mr. Chairman.

Senator KENNEDY. Thank you.

Senator Gorton.

Senator GORTON. Thank you, Mr. Chairman.

MV-22

General, you gave a thoughtful and detailed answer to Senator McCain with respect to the MV-22, but if you included in that answer when you expect the first flight test to take place, I missed it. Can you answer that very narrow MV-22 question for me?

General GRAY. I have said that I expect the MV-22 to have performed its first flight test not later than midnight on the 16th of March.

Senator GORTON. That is accurate enough, precise enough, at least. Thank you.

You also just now in speaking of your O&M budget with Senator Exon expressed some very real concerns about these budget constraints. Can you elaborate a little bit on these cuts in the last years and the possibility of cuts in future years with respect to the true bottom line, your actual readiness to engage in the functions and activities that you are designed to engage in?

General GRAY. We can and we should again, with your permission, do that for the record so that the numbers and percentages can be accurately displayed over time.

What we have been able to do is actually increase our level of preparedness across the spectrum. As I said, we have modernized and we have focused pretty well. But, we have gone about as far as we can go.

For example, we are doing just about all the training closer to home that we can do from our various bases. We are cutting back on the size of the forces that deploy overseas for operations on the northern flank of NATO, and elsewhere around the globe.

We have gone about as far as we can with the resources we have and the amount of simulation that we do for both ground and flight-type training. We have enhanced, at really no cost, our study periods, seminars, war games, colloquiums and that type of thing right down to the corporal level. We have introduced a non-traditional or off-duty education program for all the officers and staff non-commissioned officers, which they will either do or seek some other profession.

We have already dipped into some of our prepositioned war reserve stocks to continue the level of training that is necessary for full preparedness. Now we are in a position to do this because we had the best sustainability posture of any of the services. We have always done what we were supposed to do with respect to the defense guidance. But we are into that now; so, that is a concern.

The challenges that face your Marine Corps in the years ahead are just how to keep this force in readiness, in the numbers that we believe are needed to meet our global commitments and the like. Yet, we must not go back on taking care of our people. We cannot hinder, for example, the quality of life. People are our strength, and we are concerned about these things. We have to absorb, as you know, pay raises and that type of thing, which we have done.

We are concerned that some of the quality of life indicators, in some ways, are as good as they were even in 1979; for example, in the competitive salaries of our people. So those kind of issues all have impact on your challenging question. Again, if I could give you some details, I think it would be more useful.

Senator GORTON. Thank you, General.

SPECIAL OPERATIONS COMMAND

I am very new on this committee and I am a long way from learning all of the acronyms, much less what they mean and how they relate to one another, so let me try one out on you. Toward the end of your testimony on page 13 you talk about the Special Operations Command and your relationship with it and your cooperation with it.

I would really like to know where does that fit into the kind of special operations that you did in the past or plan in the future to have conducted by the Marine Corps itself and particularly with these ARG/MEUs that you spend so much of this formal testimony on. What is that relationship?

General **Gray**. Well, fundamentally the special operating forces part of the Unified Special Operations Command on the land side, as you know, are the Army Special Forces units; the Special Force A teams and B teams and that type of thing, structured basically the way they were prior to Vietnam and throughout the Indochina conflict.

The maritime special forces part of this command are the Navy Sea-Air-Land or SEAL units that perform in brown water type situations and the like ashore. Then the Air Force portion of that, the Special Operations Wing, provides air commando type support, if you will. Then, of course, they have the counterterrorist organization.

Now their missions and their tasks really transcend the entire spectrum of conflict. They have a number of requirements on the high end as well as in the middle and lower end, that is generally or periodically overlooked when we talk about this entire capability. They need to have good people, good equipment, good training, and they need to have linguist backgrounds.

They were conceived really as an organization that could go into another country to develop and further a guerrilla warfare-partisan-type capability in those countries. They were not, in my judgment, properly used in Vietnam. They are good and they are getting better. I have a longstanding interest in them. I for a long time served on the Army Special Program Review Group for Special Forces, and I like to think I am one of the better friends they have. We spend a lot of time trying to support them and help them.

The differences are perhaps subtle, but we come from the sea with a capability that can operate either in the conventional/general purpose mode or the unconventional mode. We come over the horizon and move into a trouble spot. For example, we may be given the mission to evacuate civilians in a hostile or non-hostile environment; the former being the case in Saigon and Phnom Penh and so on in 1975. You know, the Nation expects us to be able to do this. We have been organized, trained and equipped to do that as long as I have been a marine, some 38 years, and we do it. Sometimes we do it better than other times, but we do it. It does not mean that others cannot do it, but we do those kind of things. You do not need another specially-developed capability to do that; you have got one. It does not mean others should not be prepared to do it, too.

For the good of the country I have to pay a lot of attention and make sure that forces are used generally in the way they are organized, trained and equipped. I worry about that. That is the secret of joint operations. When all else fails, use the resources generally along the lines they were organized, trained and equipped to execute, and do not get it mixed up. We have a penchant for that, as you know. When you talk about a raid, a special purpose raid, that is not the sole purview of only somebody's special forces. That is not true in any country. Commandos do that. Your marines, when they come out of this new infantry training program, are going to be basic commandos. So I think it is a question of the kinds of missions and tasks that are needed to be performed.

Military assistance should not be the sole purview of any particular group. All military organizations, particularly in low intensity conflict, are going to have to be able to help in military assistance and civil affairs.

We did this all the time in Southeast Asia with our combined action platoons and our regional support efforts and building hospitals, schools, bridges, roads, helping a nation grow. That type of assistance is part of stability type operations which is crucial to the topic here today.

In the Navy we have got construction battalions. In the Marine Corps we have a force in our combat engineers. We can drill wells just like anybody else can, if they have been trained and equipped.

So what I am trying to say is that we have this capability that your Nation needs anyway for the big conflict and the medium conflict, and it is prepared to go. Those resources ought to be considered prepared for use in these regions, as well. Indeed, as I have indicated, 26 of those regional contingency plans are these type of activities. It is the same with the war on drugs, as it becomes further articulated and defined by the administration and others. If we have resources in your Marine Corps that can contribute to that, then they should be so used. As I believe you know, we do that now. We fly forward-looking infrared missions for them, have for many years. Some of my people are very actively engaged in training Drug Enforcement Agency people in low order tactics and techniques. So that sort of aggregate usefulness I guess is the bottom line, and that is what we provide.

Senator GORTON. Thank you, Mr. Chairman.

ROLE OF MARINES IN ISSUE OF INTERDICTION

Senator KENNEDY. General, in your correspondence with Senator Cohen you mention on the last page "the key to security is early warning dependent upon accurate, timely intelligence. Combatting terrorism must become an increasing concern for everyone, both in and out of Government. Guerrilla warfare increasingly is being used to cover for narco-terrorism. The considerable threat that drug cartels pose for our security is growing."

How do you define the appropriate role for the Marines in the whole issue of interdiction? What do you think you can do? What do you think are the limits on what you can do? Can you give us some response to that issue?

General GRAY. Excuse me, Senator, interdiction?

Senator KENNEDY. In terms of the whole effort that will be made there are probably four elements in the battle on drugs. You have interdiction. You have an education program. You have treatment and support for local law enforcement. And there will be debate—it has begun really—in terms of the approval of the new drug czar, Mr. Bennett, last evening. There will be an appropriate role for the military and that is being defined.

But in terms of interdiction, do you think the Marines have any role and what do you think it should be?

General GRAY. Well, as you have indicated, Senator, the potential roles and the like, will emerge over time. Clearly we need to have a comprehensive grand strategy to deal with this, as well as, subsets throughout the world because the countries and the problems therein are different in many cases.

We certainly, I believe, can help. We can help in the planning. We can help in the development of the process to flesh this whole concept out. We have people who have spent a great deal of time on this topic. We have done our homework. We have sent a signal that we are prepared to assist. As I have indicated, we are already conducting training in that type of activity for the Drug Enforcement Agency and others.

We are prepared to do more. You are quite right, though; we have to have an attack on all sides. In the education process in this country, for example, we can help with our Reserves. We can help with our Junior Reserve Officer Training Corps cadets in high schools, of which we have some 86 units around the country. We can help by fostering an outward bound alternative. We have to get into the social aspects of this. We can help, I think, in a variety of ways. Of course, if there are special operations or other types of military requirements that are essential to this grand scheme, then our forces are already in the Unified Commands and they are available to do that. That answer can be articulated further in the next few weeks.

This is, as you know, a fast-moving train right now. I think we are finally getting down around the 20-yard line where we can score some touchdowns.

Senator Kennedy. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman.

I would like permission to include a number of items in the record: the letter that I wrote to General Gray, his response to me, a letter also that we received from Brent Scowcroft in response to the joint letter that we sent to him.

[The information follows:]

U.S. SENATE,
Washington, DC, February 10, 1989.

Gen. ALFRED M. GRAY,
Commandant of the Marine Corps, Headquarters, Marine Corps, Washington, DC.

DEAR GENERAL GRAY: As the Vice-Chairman of the Senate Select Committee on Intelligence, and the ranking member of the Projection Forces and Regional Defense Subcommittee of the Senate Armed Services Committee, I have considerable interest in U.S. capabilities for coping with the unconventional conflicts that predominate in the world today. I know that you, as the leader of the Service with the greatest past involvement in irregular wars, the greatest likelihood of future involvement in what has come to be called "low intensity conflict," must share my concerns.

Because of your substantial expertise on these complex issues, and the important role of the Marine Corps in giving our country a capability for projecting force in the Third World, your views on these matters would be of great interest to me. In particular, I would welcome your response to the following questions:

(1) Is it important, for purposes of strategy, doctrine, organization, and tactics, to distinguish between conventional and unconventional conflicts (e.g., counterinsurgency)?

(2) How well prepared is our country for dealing with low intensity conflicts?

(3) If our nation is not well prepared to engage in low intensity conflicts, what are our greatest current deficiencies?

(4) What is your view of the potential importance of the NSC Coordinating Board for Low Intensity Conflict?

(5) Finally, do you have specific recommendations for resolving any of the deficiencies identified above?

I fully appreciate the fact that these are difficult issues and that you have many demands on your time. However, your thoughts on these matters would be of great value to me in the performance of my duties on the Senate Intelligence and Armed Services Committees. While I believe that our foremost objective must continue to be the deterrence of nuclear warfare, I do not believe we can ignore the many conflicts in the Third World that are threatening our access to key areas and facilities; generating hundreds of thousands of illegal immigrants; contributing to our drug problem; contributing to international terrrorism, and resulting in hundreds of thousands of fatalities each year (primarily among civilians). Indeed, as Secretary Shultz has said, "Low Intensity Conflict is the prime challenge we face, at least through the remainder of the century. The future of peace and freedom may well depend on how we meet it."

In sum, your thoughts on the challenges posed by terrorism and guerrilla warfare would be most welcome.

With best wishes, I am

Sincerely,

William S. Cohen,
U.S. Senator.

Department of the Navy,
Headquarters U.S. Marine Corps,
Washington, DC, March 8, 1989.

Hon. William S. Cohen,
U.S. Senate, Washington, DC.

Dear Senator Cohen: I share your concerns regarding U.S. capabilities for coping with unconventional conflicts in the world today as addressed in your letter of February 10, 1989. I have repeatedly, over the years, asserted that it is in the Third World regions where many of our vital interests lie, the so-called low intensity conflict (LIC) arena, where we are most likely to be committed in the coming decades. As we deal with LIC, there are two very important rules; avoid making more enemies than you already have; and ensure all actions benefit the people of the host nation.

For the single purpose of national strategy, it is *not* important to distinguish between low intensity and conventional conflicts. In our pursuit of peace, security, and freedom, our national strategy should identify clear national objectives. However, for the purpose of regional and country strategies and for the purposes of doctrine, organization, and tactics, it *is* important to distinguish between low intensity and conventional conflicts.

The nation, with historical perspective, has developed doctrine, organizations, and tactics that are well suited for closing with and defeating enemy forces in direct combat. On the other hand, LIC is waged by a variety of means to include political, economic, informational, and military actions. The doctrine, organizations, and tactics developed for conventional conflicts are not well suited for LIC. As an example, for counterinsurgency operations, Small Independent Action Forces (SIAF)—small units that can stay in the field for long periods of time—are much better than conventional units.

The most significant LIC concerns are inadequate security assistance and the lack of a civil military doctrine.

Security assistance remains the cornerstone within the LIC arena. As such, adequate funding is paramount. Insufficient security assistance funding in conjunction with increased congressional earmarks for favored nations has thwarted the USG's ability to conduct realistic programs in the most vulnerable Third World areas. Without realistic security assistance funding, we degrade our ability to resolve LIC short of major military intervention. The current annual funding policy gives the perception that there is no assurance of USG support in subsequent years. Multiyear funding would serve to assure our allies of our resolve for continued support. Support to nations requires low technology, maintainable and functional equipment. U.S. industry is concentrating on high technology items and cannot supply the required items. Current restrictions on providing training to foreign law enforcement agencies hamper our efforts to counter illicit drug trafficking. Additionally, Unified Commanders should have more discretion over the use and funding of security assistance designed to enhance regional security.

Assisting friendly governments combat the military threat is but one element of a comprehensive LIC strategy. There is currently no civil-military doctrine for executing a LIC campaign. A coordinated direction of the DOS, DOD, and intelligence agencies at the national, regional, and country levels is essential.

As a nation, we have the basic tools needed to deal with LIC. However, we are without an efficient apparatus to focus and coordinate U.S. Government actions. We need a forum to orchestrate the efforts among the DOD and civilian agencies for strategy development; integration of U.S. and host nation assets; humanitarian assistance and civic action programs; and the coordination of intelligence assets. This focus and coordination must include all agencies and policies that represent the four elements of national power: political, informational, economic, and military.

It is imperative that we develop a clear U.S. policy with top down, Presidential direction. This policy will give unity of effort and establish clear lines of authority across multiple government agencies while prosecuting a LIC campaign.

The NSC Board for LIC is the vehicle to provide national level coordination. The board is currently a cabinet-level group chaired by the National Security Advisor. As the vast majority of issues that need resolution never reach this level, it seems advantageous that the board be redefined at an appropriate level that can act authoritatively on these issues. This board should take an active role in solving the security assistance problem. It should set about making a precedence list of countries and regions which potentially call for USG involvement in LIC.

Armed with the precedence list prepared by the LIC board, DOS should have the lead in developing regional/country specific plans. A DOD LIC Master Plan is essential for top down guidance for conducting LIC. Our nation must be prepared to accept the premise that LIC is a long term commitment wherein immediate results will not be evident.

Regarding your query concerning terrorism and guerrilla warfare, the challenges posed by terrorism are formidable. These are especially apparent when we consider the advances in technology of explosives and the sophistication that some terrorist organizations have attained. The key to security is early warning dependent upon accurate, timely intelligence. Combatting terrorism must become an increasing concern for everyone, both in and out of government. Guerrilla warfare increasingly is being used to cover for narco-terrorism. The considerable threat that drug cartels pose for our security is growing. These organizations have the financial resources to corrupt individuals and governments and are thus extremely difficult to thwart. As more U.S. military assets become committed to the war on drugs, our personnel will become more likely targets for security compromises. The challenges before the nation will demand nothing short of our best.

I have taken this opportunity to enclose a Concept for the Employment of Naval Forces in Low Intensity Conflict. I and my staff stand ready to assist in your efforts to improve our national capabilities to deal with low intensity conflict.

In summary, the same type of amphibious/maritime expeditionary forces—general purpose forces—that are essential for credible deterrence or warfighting across the spectrum of conflict are, by their nature and their focus, the most prepared to deal with these revolutionary war situations. Aggregate usefulness to the country is the goal of your marines.

With warm regards and "Semper Fidelis."

Sincerely,

A.M. GRAY,

General, U.S. Marine Corps, Commandant of the Marine Corps.

CONCEPT FOR THE EMPLOYMENT OF NAVAL FORCES IN LOW INTENSITY CONFLICT

The United States, as a maritime nation, is dependent upon the freedom of navigation within the sea lanes of communications. Because of this, our strategic requirements demand a wide range of military capabilities to project credible military power and influence to all regions of the world. The ability of the United States to project power and/or assist in the maintenance of regional stability is dependent upon our access to foreign bases and overflight rights. Recent negotiations to maintain bases and facilities overseas have highlighted the potential erosion of alternatives for forward basing U.S. military forces. This gives further credence to the argument that our nation will increasingly rely upon naval forces to deter aggression and provide for regional stability. Our recent experiences in the Persian Gulf reinforce this argument. The Navy/Marine Corps team provides the National Command Authorities and Unified commanders with forces ideally suited for the conduct of operations within the low intensity conflict spectrum.

The strength of the Navy/Marine Corps team lies in its ability to provide specially task organized, light, self-contained forces which come from the sea and are self-sustaining, completely integrated, combined arms forces under a single centralized command that is capable of quickly and effectively executing their mission through a central command with decentralized control.

These task organized forces are forward deployed today in the form of Amphibious Ready Groups/Marine Expeditionary Units (Special Operations Capable) (ARG/MEU(SOC)). For contingencies requiring larger forces, the Navy will tailor amphibious shipping by composition and numbers into amphibious groups and the Marine Corps will provide the landing force in the form of Marine Air-Ground Task Forces (MAGTFs) either as Marine Expeditionary Units (MEUs), Marine Expeditionary Brigades (MEBs) or Marine Expeditionary Forces (MEFs). These naval forces can be precisely tailored according to the threat, geography and mission—and quickly adjust them as situations dictate. MAGTFs operating from amphibious shipping can, from a secure seabase use organic air and surface assets to insert forces into and extract forces from locations without having to use vulnerable and highly visible facilities ashore. The medical facilities available in amphibious ships or hospital ships provide medical care equal to or greater than host nation capabilities. MAGTFs have the organic sustainability and with seabase support can remain on the scene for extended periods, and act as either a component of a joint task force or as its headquarters.

Seabased MAGTFs can:

Assist friendly or allied governments to maintain internal stability and public welfare. The inherent command and control, and all source fused intelligence capabilities can provide non-visible (offshore) assistance to the country team improving host nation capabilities.

Conduct presence missions such as joint exercises and show of force.

Conduct peacekeeping operations, usually in a potentially hostile situation.

Conduct humanitarian assistance in response to natural disasters, as a product of deliberate bilateral agreement, and as civic action projects.

Conduct mobile training teams as the principal security assistance tool.

Protect U.S. lives and property.

Assist in countering insurgent threats through a combination of selected field, intelligence, psychological, and civic action operations.

Provide assistance in the form of individual military skills training and operational planning assistance to interagency task forces.

Conduct counternarcotic operations to include providing aerial and ground surveillance and reconnaissance functions; providing command and control, as well as mission planning instruction to U.S. Government agencies; providing military technical skills training; and providing supporting mobility for U.S. agencies and host nation forces.

Conduct amphibious raids as well as port and airfield seizures.

Protection or evacuation of non-combatants.

Reinforce committed national or international forces.

Recover downed aircrews, equipment, and personnel through open or clandestine insertion of forces by air or surface means.

Execute counterterrorist operations to prevent, deter, and respond to terrorism. The employment of MAGTFs in counterterrorist operations will likely be in a supporting role. They can be tailored to support joint or combined operations or, in extreme situations, to conduct unilateral counterterrorist operations.

Insert and support Marine combat units as Small Independent Action Forces (SIAF) which can operate over long ranges providing a direct action capability against guerrillas or insurgents within regions under their control.

Can provide a force ashore which is predominately combat oriented vice support oriented.

The Navy/Marine Corps team has the inherent capability to respond to the majority of the mission requirements of LIC. The Navy/Marine Corps team is ready and forward deployed.

THE WHITE HOUSE,
Washington, DC, March 1, 1989.

Hon. WILLIAM S. COHEN,
Subcommittee on Projection Forces and Regional Defense, Committee on Armed Services, U.S. Senate, Washington, DC.

DEAR SENATOR COHEN: Thank you for your letter on the need to give serious attention to planning and preparing for low intensity conflict. I agree that unconventional conflict in the Third World, including terrorism, insurgency, and instability caused by illegal narcotics trafficking, is a serious threat to U.S. interests and the security of developing democratic states.

The previous Administration set out strategic principles that will guide us in dealing with low intensity conflict. Our strategy calls for integrated political, economic, informational, and military programs to address the underlying causes of instability, ideally before conflict that threatens important U.S. interests can emerge. It also states that U.S. military forces are to be used in low intensity conflicts only as a last resort. The principal U.S. military role is indirect, exercised through security assistance.

I agree that we must increase effectiveness of U.S. capabilities for dealing with Third World security problems and will pursue efforts to do so. There are a multitude of programs in many different departments and agencies involved in low intensity conflict. Unfortunately, virtually all these programs face severe resource constraints because of inadequate funding in the foreign affairs budget and restrictions on how available money can be spent. It will be important for you to help us by working with your colleagues to overcome these problems and build throughout Congress the broad support and consensus needed to carry out the coherent low intensity conflict strategy we all support.

I also believe that we must do everything possible to coordinate policy responses to low intensity conflict. I assure you that Third World security issues will be a priority concern of this Administration, there will be a focal point on my staff for low intensity conflict, and I will establish procedures to achieve effective interagency policy coordination. Specifically, the Board for Low Intensity Conflict will play a meaningful role in developing and coordinating U.S. security policy. It is somewhat premature, however, for me to be more specific about the composition of the Board. Many of those who will be key participants have yet to be nominated or confirmed in their positions. I intend to seek their advice and incorporate your views and the findings of our review of overall national security strategy in making final decisions on how best to manage low intensity conflict issues. I intend to make these decisions at the earliest possible date. In the meantime, as my thinking in this area progresses, I look forward to discussing low intensity conflict with you. My staff will also be in touch with yours.

Sincerely,

BRENT SCOWCROFT.

Senator COHEN. Just a couple of other questions. General, while you are going to be at Camp David I am going to be at Camp Maine this weekend, and I hope you will indeed bring to the attention of the administration the seriousness with which we view the matter, and you do as well.

DEMOCRACY IN THE THIRD WORLD

In our letter to Brent Scowcroft we said that "this is going to require careful analysis"—that is, the promotion of democracy in the Third World, protecting our interests in the Third World—"a coordinated strategy, and attention to a number of issues and programs including security assistance, debt relief, intelligence and communications support for the Third World allies and friends, international military education and training programs, military personnel management, and research, development, and acquisition for low intensity conflicts.

"It is evident that serious progress will not occur without active involvement by the National Security Council staff, and we encourage you to make these issues high priority." Do you agree with that statement, first of all?

General GRAY. Yes, sir.

Senator COHEN. I hope that you will raise that with those in the NSC staff who might be up at Camp David.

Also, reference was made, I believe in response to when Senator Gorton was conversing with you, about the Army Special Forces.

They are to be distinguished, are they not, from Special Operating Forces? As I understand it, the Army Special Forces include those units that go behind the lines as such to try and build up the support of the indigenous forces, but Army Special Operating Forces include Ranger units, Delta Force, SEALS and others.

Is there a distinction between the two in your mind?

General GRAY. I guess they can make any kind of distinctions they want of how they describe all this. That is really their purview. I do what I can to understand their latest concept on all these things. Clearly Rangers, for example, can be used for special operations—a raid or that type of thing—such as the raid they successfully did in the Philippines many years ago to save some prisoners; that is sort of my theme, really. Good, tough, versatile professionals can do pretty much anything that comes down the pike. I think that the key point here is we have got to clearly understand the distinction. Special Forces/Special Operating Forces and low intensity conflict, are two totally different things. One is a capability which has application across the spectrum, to include unconventional warfare; and the other is a much broader challenge that we face.

RAIDER BATTALIONS

Senator COHEN. One final point. Are you familiar with the history behind the so-called Raider battalions, I guess at the start of World War II?

General GRAY. Marine Raider battalions?

Senator COHEN. Yes.

General GRAY. Very much so.

Senator COHEN. And they were going to assign the Raider battalions special types of missions. My understanding is they met with some resistance within the Marine Corps at the time. The question I have is, number one, could you perhaps just discuss advantages and disadvantages of such Raider battalions, and whether or not you perceive any resistance within the upper echelons of the Corps to employing the Marine Corps as part of the low intensity conflict activities?

General GRAY. Well, let me answer the last one first. There may have been some prior to a year and a half ago, but none now. And even then General Kelly made it very clear, you know, this was his concept that I was the engineer and he was the conductor. So we are all as one now. Clearly the aggregate usefulness and the contributions we can make, are the raison d'etre for your Marines. So this fits.

On the Raider battalions, like any other special type of operation, you will get some resistance. For example, we had extreme resistance in the middle 1950s when we attempted to create tactical signal intelligence/electronic warfare units, the same type of thing. However, right prevails.

The Raider battalions and later the regiment were actually formed pretty quickly, starting at Quantico, as you know, and were employed in Guadalcanal and Talagi and, of course, many other places throughout the Pacific. In a similar vein, the parachute Marines had some initial difficulties, but all of that was resolved.

The challenge you face when you form these units, like when the British formed the commandos and additional commando units early in World War II, is that you take the best officers and noncommissioned officers and you move them to this new activity. That movement is why the resistance starts. It is understandable because if you are not careful you have got the bulk of your army led by the second team. You have to be very careful here and have to have a balance.

So I think our approach here has been pretty sound.

Senator COHEN. Thank you very much, General.

Senator KENNEDY. Thank you very, very much, General. Senator Dixon has some questions. Senator Glenn had to leave, but he wants to continue to be involved in this issue, and we obviously welcome his involvement.

ACROSS-THE-BOARD CUTS

We thank you again for your presence here. You mentioned the policy of across-the-board cuts. I could not agree with you more about the percentage cuts. They really are not responsible. I think what we have seen in the broader context is in the past years we have tried to get decisions and choices being made within the military that there has been reticence to identify those particular systems.

This hopefully will be altered and changed by any new Secretary of Defense, and I think under Secretary Carlucci progress was really made.

We are very mindful that you have taken the personnel cuts, most recently I believe a reduction of about 2,900 personnel. So I think that has to be something that would be considered in any kind of judgment that is going to be made over in the Pentagon in terms of the future.

I just want to say it is an impressive record in the recent times in utilizing technology which is most suited for the responsibility of the Marines. I think you have developed that cutting edge technology for the service which has to be impressive and I think it would be extremely unfortunate to put any kinds of restraints on those developments. You have made a very powerful case.

I want to thank you very much for your appearance here. It has been very, very interesting, as always, and we will look forward to continuing to work with you in the future.

We have a number of questions for you to be answered for the hearing record.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

LOW INTENSITY CONFLICT

Senator KENNEDY. You are in the process of restructuring the active-duty Fleet Marine Forces into a lighter force, tailored for the expeditionary mission, particularly in low-to-mid intensity conflict situations.

What role do you see for the Marine forces in low intensity conflict and how is this distinct from roles that may be assigned to other U.S. military forces?

General GRAY. We have been pursuing a number of initiatives to improve our capability to perform our legislated roles and missions. While a purpose of these initiatives is to reemphasize and improve our expeditionary capabilities to respond to the unique challenge of low intensity conflict, I must point out that the benefits of these efforts are not restricted to the lower level of conflict. They have improved our capabilities across the spectrum of conflict.

Multi-mission capable forces, flexibly sized to the mission, possessing the characteristics of speed, mobility, and sustainability will have the greatest utility and, thus the highest probability of future employment. Today, as in the past, the mission of your Marine Corps is to provide these type forces. As envisioned by Congress, our ability to task organize expeditionary air-ground-logistics teams under a single commander appropriate to the situation, its intensity, and its duration is a unique quality of the Corps and our partners on the sea, the U.S. Navy. It is important to note that by expeditionary, we mean light enough to get to the battle, deep enough to sustain the battle, and heavy enough to win the battle. To provide you a better idea of how we envision the Navy-Marine Corps Team being employed in low intensity conflict, I have furnished in our "Concept for the Employment of Naval Forces in Low Intensity Conflict."

Meeting the demands of our future national security challenges requires the complementary roles and missions of all the Services. The challenges of future conflicts will not include a "crowded battlefield." The complementary nature of the Services' roles and missions was well expressed within the Committee on Armed Services Report to the 82nd Congress, while discussing The National Security Act of 1947 (the Unification Act) which stated "The purpose of ensuring a ready Marine Corps of four combat divisions and four air wings is not to provide either the land forces or the air forces necessary for the effective prosecution of war. Rather, its purpose is to provide a balanced force in readiness for a naval campaign and, at the same time, a ground and air striking force ready to suppress or contain international disturbances short of large-scale war. The committee feels that, far from being duplicative or competitive, such a force would better enable the Army and Air Force to concentrate on their major responsibility of preparing for all-out war." [1]

COMBINED ACTION PROGRAM

Senator Kennedy. In Vietnam, the Marine Corps developed the Combined Action Program, which assigned a Marine squad to a South Vietnamese Platoon. This program had great success as an integral part of a genuine counterinsurgency.

What lessons should be drawn from the Combined Action Program for future U.S. efforts to assist friends and allies who are engaged in counterinsurgencies?

General Gray. We have done a lot of studying of our experiences in Southeast Asia. There were a lot of good lessons to be learned regarding revolutionary type wars. Certainly one program worth looking back at with an eye towards the future is the Combined Action Program, while a lot can be said about this program, I believe there were four key lessons learned:

1. *Intelligence.* Assigning a Marine squad to an indigenous force provides the mechanism for obtaining all the tactical intelligence available to that indigenous force. This is particularly true of human intelligence which is the most difficult type of intelligence for U.S. forces to obtain but is the most common type of intelligence available to indigenous forces.

2. *Backbone.* Assigning a Marine squad to an indigenous force provides an instant backbone of professionally organized, trained and equipped personnel. This provides the indigenous forces a core to lean on until they achieve the requisite organization and training.

3. *Infrastructure.* Assigning a Marine unit to an indigenous force provides a connection to an infrastructure in those areas in which a developing country's defense force would probably be the weakest: command and control, supporting arms, and logistics to include medical.

4. *Operations and Training.* Assigning a Marine unit to an indigenous force provides the purest form of combined operations and training. The Marine unit is in-place working with the indigenous force 24 hours a day, they share the same hardships, they are dependent upon each other and the training is continual. This lesson is the most significant because our ultimate objective in revolutionary wars must be to provide the indigenous forces the capability to provide their own security.

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[1] Congressional Record, 82nd Congress, 1st Session, Report No. 666.

STRATEGY IN VIETNAM

Senator KENNEDY. In his book, "A Bright and Shining Lie," Neil Sheehan reports there was considerable difference between General Westmoreland and Marine Generals Walt and Krulak concerning strategy.

What are your views concerning those differences?

Should we be examining that question in terms of what we need to do when faced with similar circumstances in the event of future conflicts?

General GRAY. General Westmoreland, as COMUSMACV, sensed that the center of gravity in the Vietnam conflict lay in the regular forces of North Vietnam that operated in South Vietnam. The destruction of these forces in largely conventional military operations would remove the most essential underpinning of the Communist insurrection movement in the south. Such operations would also make use of the conventional U.S. strengths in firepower and mobility and require no change in organization of U.S. forces, which were prepared and trained for conventional conflict in the NATO arena.

Generals Walt and Krulak saw the war more in terms of a struggle for the local political allegiance of the population, best accomplished by spreading military forces across a network of villages and towns to reinforce local militia, and render support to the established government. Once the population became relatively free of the influence of the insurgents and realized that the established government intended to provide for their welfare, security and economic life on a continuing basis, the essential popular support for the insurgency would disappear, rendering the North Vietnamese military campaign in the thinly-populated hinterland irrelevant.

In the end, the war necessarily required elements of both "strategies" as well as other dimensions never accomplished by the U.S. forces: elimination of corruption in the supported government and military establishment, resolution of war objectives for the U.S., reconciliation of disparate U.S. Government civil and military programs in South Vietnam, overcoming the appeal of nationalism and anti-imperialism as represented by the north, etc.

It is relevant to our present low intensity conflict concepts and global interests that we pay close attention to the record of American involvement in Vietnam. The play of political and military factors, the nature of the indigenous population and the focus on nation-building, among other aspects, commend it to present and future study.

MILITARY PAY

Senator KENNEDY. In the 1970's military pay was allowed to erode causing great hardship, indeed, many lower ranking enlisted personnel were forced to accept welfare assistance which eroded pride and caused many people to leave the service. Many men and women took second jobs and "moonlighting" income kept their families off welfare. But, in the Navy and Marine Corps people at sea had no opportunity for second incomes. Sailors and marines ashore knew assignment to sea duty meant their families had to go on welfare. That was an incredibly bitter pill for highly trained men and women to swallow, and so it was during the 70's that the sea services suffered disproportionately, and I certainly don't want to see a return to those deplorable conditions. Recovering from that period has absorbed a large portion of the defense increases of the 1980's.

General Gray would you agree that it is false economy to allow the burden of defense reductions to fall on the shoulders of men and women of our armed forces?

Are you aware of what the magnitude of the gap was in the late 1970's between comparable civilian and military pay as opposed to the current gap?

When one takes into account demographics, that is a declining military eligible age group, together with the size of the comparability gap what conclusions should be drawn?

General GRAY. Pertaining to compensation, I would wholeheartedly agree that it is improper to expect the burden of the defense reductions to fall on the shoulders of our young men and women who so proudly serve and already sacrifice so much for this Nation. We all realize in the near future some sacrifices will have to be made, but we must proceed carefully to ensure our service personnel are adequately compensated. We must ensure we do not lose our pool of trained men and women, officers and enlisted, to better compensated jobs in the private sector. The best weapons and equipment in the world are useless without well trained and highly motivated individuals to operate them.

As to the magnitude of the present pay gap, in 1979 it was at a level of 7.8 percent. Today at 10.1 percent, we are even further behind comparable civilian pay.

If the current size of the comparability with civilian pay is allowed to remain the same or increase, and taking into account the declining military eligible, it is obvious the cost of doing business will increase. Inevitably, I would envision the cost of recruiting and retaining quality personnel going up.

FAST SEALIFT

Senator **Kennedy**. General Gray, the Projection Forces Subcommittee is very interested in doing something about what we perceive as a gap in our strategic capabilities. We recognize that airlift is important in the immediate reinforcement and limited resupply role, but that it quickly tops out in its capability to sustain the logistic build-up upon which a conflict lasting more than a few weeks critically depends. Too, we recognize our merchant marine capabilities have declined to levels which no longer can satisfy our military contingency needs. This subcommittee is not the appropriate agent to foster solutions to the national problem of what to do about the merchant marine. But, we have a clear responsibility to ensure that when the national interest requires American troops to be projected into hostilities that those troops will receive timely and sufficient logistic support. I think we are all in agreement that such support means sealift.

Do you believe there is a requirement for sealift which is dedicated and which can arrive quickly to the scene of a crisis?

Do you believe that ships designed to be capable of satisfying the sealift requirement could be capable of serving in an amphibious role?

What do we need to do to get such a ship?

General **Gray**. The sealift dedicated to forces sent to handle crises resides properly in the amphibious force of the Navy. Traditionally, we have called upon our ready Navy-Marine Corps team to deal with an immediate crisis. But the general-purpose sealift designed for the reinforcement of our forces overseas and the sustainment of all military forces overseas can be made more effective by designing multi-mission ships which serve the amphibious, combat logistics and sealift requirements with minimal conversion. Exclusively commercial applications are futile to pursue, just as previous generations sought merchant marine applications for nuclear power. Military requirements set the pace in naval architecture.

Multi-mission design appears to be the only reasonable solution, and we believe that we should build these characteristics into our amphibious ships so that they can perform a variety of tasks. Our concepts for the new LX ship are making new inroads in this regard.

Multi-mission ship designs seem to offer a worthwhile course of action. Budget constraints mean we may not be able to afford large enough fleets of mission-peculiar ships to meet all commitments. In the case of the amphibious-logistic support-fast sealift category, there seems to be enough similarity in mission characteristics to justify an inquiry. It may be enough to observe that each of these missions involves high-value cargo and all presently require escort forces which will remain very scarce in the force structure of the 1990's. Our opportunity for action in the next decade is shaped by the real requirement to replace 48 amphibious ships and 7 combat stores ships which will reach the end of their already over-extended service life. In addition, we must build an unspecified number of fast sealift ships to match our national strategy and the resulting force deployment requirements of our unified commanders. The capabilities of these ships are readily apparent. Any two of the three missions include common requirements for payload and transfer capabilities.

Emphasizing modern concepts of modularization in naval architecture and containerization in payload handling ought to bring us close to a single idealized design, configured to carry a variable quantity of troops, containerized cargo, vehicles, craft, aircraft, and modules of C3I and self-defense systems as the missions require. Conceptually, such a multi-mission ship might resemble a low-freeboard VTOL carrier with a single hangar deck, connected by ramps and elevators. Each deck could carry modules, containers, vehicles or aircraft, with the hangar deck accessible to the exterior near the waterline for Ro-Ro operations or air cushion vehicle embarkation.

In addition, multi-mission ships built for these three missions could benefit materially from the speed and seakeeping improvements that we foresee with Surface effect ship (SES) technology. SES technology has been commended to the naval services by Congress for several years, and recently by the CNO's own Naval Studies Board, which deliberated over "Implementation of Engineering Technology for the Navy-Marine Corps of the 21st Century".

QUESTIONS SUBMITTED BY SENATOR J. JAMES EXON

SEALIFT SHORTAGE

Senator EXON. Do you view the sealift shortage for the U.S. Marine Corps as a critical issue? If this is a serious problem, how do you intend to rectify the situation? Are the three Maritime Prepositioning Ship (MPS) Squadrons that you have deployed, enough to handle this nation's ever growing military commitments around the world? Are they deployed in the most likely areas of potential conflict? How are these squadrons protected from terrorist activities in peacetime?

General GRAY. The Marine Corps remains in an obviously enviable position regarding general sealift. We have U.S. Navy amphibious ships programmed or in hand to carry the assault echelons of a Marine Expeditionary Force (MEF) and a Marine Expeditionary Brigade (MEB); three USN MPS squadrons serve three more dedicated MEBs and we see enough common-user sealift available to satisfy our assault follow-on echelon requirements. The remaining sealift assets are clearly not sufficient for the needs of the other services and for long term resupply of all our forces. I urge this committee to consider the declining U.S. flag and U.S. controlled merchant fleet as a strategic liability.

The Navy MPS squadrons, and their associated USMC brigades are well postured to meet their designed purpose. They are not intended to respond to all of the national military contingencies, so I think the question of sufficiency is a "yes", because the squadrons provide, along with airlift, the means for transporting the three brigades to an operational area. Now, as to geographic position, the three sites in the Indian Ocean, Western Pacific and Eastern Atlantic correspond to our best estimates for future missions. In addition, we can move the squadrons elsewhere in advance of the mission orders, because of their steaming readiness.

Protection of the squadrons against terrorists and other threats is accomplished primarily by remote positioning. If a threat is determined, our first action is to put the ships underway and put distance between them and the threat. The ships have some defenses and we can augment them fairly rapidly. Fleet Marine Force units have additional missions to reinforce the MPS defenses and they routinely conduct such exercises.

RETENTION/RECRUITMENT

Senator EXON. As you are probably aware, the Navy is experiencing a problem in retaining qualified aviators. Is the Marine Corps having a similar problem with the retention of qualified aviators? How serious is the problem and what is your recommendation in solving this issue?

General GRAY. The Marine Corps has enjoyed satisfactory pilot retention since fiscal year 1983 even though our pilot retention rates have been comparable to the Navy's for this period. Our retention rate requirements are lower than the other Services, primarily because the Marine Corps pilot grade structure is more heavily weighted in junior officers (company grades) than our sister Services. Current Marine Corps pilot retention trends are lower than desired. Since October 1, 1988, a small shortfall of Marine Corps pilots has slowly developed to the point that we are now short 139 *company grade* pilots. Although that only equates to about 5 percent of the total *company grade* pilot requirement, this insidious decline in the pilot inventory is cause for concern, and will result in an increasing shortfall this fiscal year and beyond, unless retention is improved. The Marine Corps has taken personnel management actions to guide pilot retention back up to the required rates. However, the extent of control exercised by the Marine Corps over pilot retention is diminishing. At the present retention rates, the shortfall of *company grade* pilots may increase to 10 percent of their requirement by the end of this fiscal year.

Personnel management actions may not be enough. We are feeling some negative backlash effects of the bonuses being paid to pilots from other branches of the Armed Forces. The Marine Corps is hopeful that we will not need to establish an aviator bonus program next year, but we are keeping our options open to correct the growing pilot shortages in some communities.

Senator EXON. In regards to recruitment in general, is the decreasing recruiting budget and the shrinking of the pool of potential recruits, having an effect on maintaining the end strength and quality of the Marine Corps? What additional incentives are needed to stem this problem?

General GRAY. We have maintained our end strength and a quality force by maximizing our recruiting resources in a declining fiscal environment. As we move into the 1990's, the potential for recruiting difficulty exists. Further anticipated budget reductions, reduced QMA, and increased competition from industry and the proposed National Service Act could have a negative, synergistic impact on recruiting. Fundamental to our continued success is the appropriation of resources to ensure our recruiters are provided with the necessary assets to compete in the increasingly difficult market place. We support the President's budget, but should funds become available, additional advertising dollars can be used to enhance our lead generation and awareness efforts. We have identified a shorfall of $2.0 million in fiscal year 1990 and $2.4 million in fiscal year 1991 in our awareness advertising plan. Maintaining an adequate level of awareness advertising is an integral part of our recruiting strategy. Closely aligned with this effort is our recruiting lead generation program which is directly related to our ability to maintain a general awareness among our target population. As awareness declines, the direct impact is a loss of leads, and of course, accessions. As in the past, we continue to need congressional support in this vital effort.

ROLE OF RESERVES

Senator EXON. You have previously advocated a larger role for the Reserves and a greater integration of the Reserves with the Regulars. What are you doing to implement this strategy? Will it degrade our readiness posture? How will special operations for the Marines be affected?

General GRAY. The Marine Corps Reserve continues to train under the Total Force policy, integrating Reserve and Active units during exercises to the maximum extent possible. Our designated augmentation unit program beginning this year matches Reserve combat arms and combat support units with Active component organizations for training and contingency purposes. As this program matures, combat service support units will be included. Reserve readiness is enhanced by this integrated approach to training providing for smooth transition of the Reserve into the Active component. Integration of Action and Reserve units during crises to meet operational requirements short of mobilization, is extremely rare. Our Reserves would welcome the opportunity to contribute to Total Force requirements short of mobilization and stand ready to do so.

SPECIAL OPERATIONS COMMAND

Senator EXON. There has been a lot of publicity in regards to the lack of interoperability of the various service components. This was demonstrated in the aborted Desert One rescue operation in 1980, as well as the more successful, but still problematic Grenada invasion in 1983. As a member of the Joint Chiefs, can you tell this committee if the new Special Operations Command structure has alleviated the parochial viewpoint that has become evident throughout other integrated commands of our defense establishment?

General GRAY. From the Marine Corps perspective, we actively review and study joint operations such as Desert One, Grenada, and the Persian Gulf to gain whatever knowledge or experience we can from the lessons learned. We do this in part so that the Marines we assign to joint commands and our Marine Air-Ground Task Forces that participate as part of joint task forces are better prepared for the complexities and unique demands of integrated joint operations. Further, we participate in the full array of joint exercises within every CinC's theater. The purpose is to improve the capability and joint interoperability of our Marine Air-Ground Task Forces to respond to crisis, contingency and general war situations as a component of a joint task force. Subsequently, every exercise is analyzed, critiqued and evaluated to continue to improve our joint warfighting capabilities.

USSOCOM has responsibility for preparing special operations forces for assigned missions. A part of this is ensuring that assigned special operations forces are able to integrate into joint operations. Gen. Lindsay would best be able to talk to specific initiatives that he has underway to accomplish this and the success that he is achieving.

OVERSEAS BASING AGREEMENTS

Senator EXON. In light of the current negotiations affecting this country's basing rights in several of our allies' territories, and the damaging precedents that could be established due to these new agreements, how will this issue affect future operability of the Marine Corps?

General GRAY. The diminishing number of overseas bases will have minimal impact on the Marine Corps' ability to operate throughout the globe. The one exception to that statement is Okinawa. The forward base which Okinawa provides shortens our response time in the event a conflict breaks in the areas of South or East

Asia. Additionally, if our forces have to be employed in these regions, Okinawa shortens our forces logistical tether. Without Okinawa, however, the closest base to some of the potential areas of conflict is Hawaii—some 4,000 miles rearward. This added distance would mean that our response time for forcible entry would be lengthened by days and even weeks depending on the location of the crisis. We can offset this response time somewhat through the use of Marine Prepositioning Ships, however this is not a forcible entry means.

Marine Corps forces are configured for expeditionary service which means that they can easily be deployed using a variety of strategic mobility options. Additionally, its forces can be maintained aboard amphibious shipping for an extended period of time. As a result, our forces are not greatly dependent upon overseas basing, access of overflight rights.

The diminishing number of bases will result in a greater need for Marine Corps forces. Sea-based forces will provide an alternative to this negative trend. Additionally, in the event advanced basing becomes necessary in theater of operation, Marine Corps forces can seize such bases. Such capabilities will be in great demand in the future.

WORLDWIDE DEFENSE COMMITMENT

Senator Exon. In a broader sense, how will it affect this Nation's force projection capability, and its ability to honor its defense commitments worldwide?

General Gray. The increasing inability to base our forces overseas, will place a greater emphasis and strain on our force projection capability. In such a world environment, this capability will be the only means to honor our defense commitments. Yet these assets, today, are limited in number and already in great demand. Major force projection will rely primarily on strategic sealift; an area which we are still deficient in. Of great concern is amphibious shipping which by the year 2000 will begin to experience block obsolescence. Clearly these trends in force projection must be reversed in order to meet the coming challenges of tomorrow's world.

ICBM MODERNIZATION

Senator Exon. As a member of the Joint Chiefs of Staff, what is your recommendation on the modernization of our land-based ICBMs? Should we purchase a full complement of the MX missile, and base it in existing silos or on rail cars? Should we develop and purchase a smaller single-warhead missile (SIBM) to be based and deployed on mobile truck launchers? Or should we implement some combination of the two above mentioned strategies or even develop a new one?

General Gray. The Joint Chiefs of Staff (JCS) have supported the Scowcroft Commission's recommendation for 100 MX missiles. The JCS have also concurred in Congress' view that 50 MX missiles be based on a more survival mode. The present JCS recommendation for achieving such a survivability is that 50 MX missiles be placed on rail cars. However, on the Strategic Arms Reduction Talks, START, the United States (US) holds that mobile ICBMs be banned. In my view, these seemingly contradictory positions are advantageous.

[Deleted.]

EMBASSY GUARDS

Senator Exon. What is the current situation regarding the qualifications of the Marine security forces that guard our overseas embassies? What is being done in the Marine Corps to ensure that this debacle of security violations are terminated or at the very least minimized?

General Gray. Following the disclosures concerning the security problems which occurred at the U.S. Embassy, Moscow during and prior to 1986, the Marine Corps, in concert with the Department of State, conducted a thorough review of the Marine Security Guard (MSG) Program. In addition to our own in-depth examination, studies were conducted by the President's Foreign Intelligence Advisory Board, the Laird Commission, the Senate Select Committee on Intelligence, the House Subcommittee on International Operations (Mica/Snowe Report), and the Report of the Secretary of State's Security Review Group (Amb. Brown's Report). As a result of these studies, numerous improvements were made to strengthen the MSG Program.

As to the qualifications of the MSGs, each MSG candidate is carefully screened by his or her commanding officer. Criteria for acceptance to the MSG School includes a high classification score, ability to qualify for a security clearance, a clear disciplinary record, U.S. citizenship, and the Marine must be a volunteer for the program.

Marines applying for watchstander billets (lance corporal through sergeant) must agree to remain single while serving on this duty.

Prior to the Moscow incident, only staff noncommissioned officers were psychologically screened prior to assignment to post. This screening is now given to all students at the MSG School by a Navy psychologist assigned full time to the staff of the MSG Battalion.

Assignment policies have been tightened to restrict an individual marine's ability to influence post assignment. Volunteers are no longer accepted for Communist bloc posts. These assignments are now made personally by the Commanding Officer, MSG Battalion. Back-to-back tours or extensions of tours in Communist countries are no longer allowed, and tours in the Soviet Union have been shortened. The Department of State has also implemented a program whereby marines assigned to designated hardship posts are given five days out-of-country every six months for rest and relaxation.

To further counter hostile intelligence efforts, the Naval Investigative Service (NIS), in close coordination with the MSG Battalion, has implemented a program of random counterintelligence scope polygraphing.

The training given at the MSG School has been scrutinized by both the Marine Corps and the Department of State. While the curriculum was essentially sound, that portion allotted to counterintelligence has more than doubled, and stress management classes have been added. Marines being assigned to the Soviet Union as a second post are brought back to the MSG School for refresher training and briefings prior to assignment. Additional joint Department of State/Marine Corps initiatives include Marine Corps participation in Chief of Mission and Regional Security Officer (RSO) training, to better familiarize those officials with the mission, functions, and unique roles of the MSGs.

Command, control, and oversight of the MSG Program have received considerable attention in the past two years. As a first step, in July, 1987, I established a separate staff section at Headquarters Marine Corps to deal solely with MSG policies and issues. The Director for Operations meets with his counterpart at the Department of State (the Assistant Secretary for Diplomatic Security) and has made visits to the field, to include Moscow, to assess first hand the status of the program.

Recognizing the need for closer Marine Corps supervision in the field, a new MSG company was established in October, 1988, at Frankfurt, Germany to command the detachments in Western Europe. This new company reduced the span of control of company commanders. A similar plan to divide the MSG company in Africa into two companies will be implemented later this summer.

A significant improvement in the area of command and control has been the addition of a First Sergeant to each of the company headquarters. As the senior enlisted representative of the company commander, the First Sergeant interacts directly with the detachment commanders. To date, First Sergeants have been placed at the two companies in Frankfurt and the company in Casablanca. We are awaiting Department of State approval to place First Sergeants at the companies in Nairobi, Manila, and Panama.

In summary, the Marine Corps has placed a great emphasis on ensuring that we provide the Department of State with the best trained and most highly qualified security guards for our nation's foreign service posts. The MSG Program is strong, and the continued attention it will receive from the highest levels of the Marine Corps will ensure that it remains so.

MV-22

Senator EXON. What is your opinion in regards to the proposed $1 billion in cuts for the Marine Corps' V-22 Osprey tilt-rotor transport plane program by the Secretary of the Navy?

General GRAY. The proposed $1 billion cut in the V-22 program is spread across fiscal year 1990/91. This reduction recognizes the delays in the current development and testing schedule, supports a competitive acquisition strategy, and protects existing NTE options to ensure the least cost to the government. It also reflects the fact-of-life technical problems and flight delays experienced to date. While these problems have been overcome, as evidenced by first flight on March 19, 1989, the lost testing time must be accommodated.

Senator EXON. Is it true that the V-22 Osprey program is already behind schedule, significantly over priced, and has continuing testing delays?

General GRAY. The V-22 program is slightly behind schedule at this point in time, and the cost has risen from the projection in May 1986 at the Milestone II decision. However, the 7-month delay has been accommodated in the proposed budget, and the cost has risen not because of program problems but because of external factors. These include the reduction in procurement from 913 to 657 aircraft and the stretchout of the program by three additional years. The combined impact of the reduced quantities and reduced annual buys has been increased unit cost of the aircraft.

Senator EXON. How do you intend to invigorate this fledging program?

General GRAY. The program is moving ahead now and requires no additional motivation. The initial flight envelope in the helicopter mode has been completed. After nine successful flights, aircraft #1 has been temporarily taken out of service for inspection and modifications. These modifications include adding the additional instrumentation and wiring necessary to expand the flight envelope for conversion to flight in the airplane configuration. These inspections and modifications will take approximately 6 weeks to accomplish. Aircraft two is nearing completion and is scheduled for it's first flight in mid May 1989.

MARINE CORPS O&M FUNDING VS. OTHER SERVICES O&M FUNDING

Senator EXON. You have repeatedly stated that the Marine Corps is committed to having a well-trained and quality-led force and you have demonstrated that commitment. What was the rationale then, in President Reagan's fiscal year 1990 proposed budget, for the Marine Corps' Operation and Maintenance outlay, (which pays for training), to decrease 6.2 percent while all the other services' O&M accounts were increased?

General GRAY. The Operation and Maintenance Marine Corps (O&MMC) budget received its fair share of the fiscal year 1990/1991 Total Obligational Authority (TOA) remaining after military personnel costs were fully funded. The TOA split is based on all programs—manpower, hardware, R&D and O&M—competing equally in the programming process. In this regard the Marine Corps is manpower intensive. When, as in the case of fiscal year 1990/91, there was a requirement to fund military pay raises from available TOA, the Marine Corps was required to absorb a proportionately larger share in its remaining programs. Additionally, the matter of blue-in-support-of-green funding must also be considered wherein the Marine Corps share of this funding increased in fiscal year 1990.

AIR DEFENSE SYSTEMS

Senator EXON. I understand that the Marine Corps had entered into a multi-year contract to purchase the Hawk air-defense missile system, but that due to budget constraints DOD requested that they give up the last two years (fiscal year 1990 and 1991) of the contract to the Army which had a more urgent priority. Does the Marine Corps plan on entering into another contract to purchase an air-defense missile system? What does this contract termination do to your present operational readiness posture?

General GRAY. The Marine Corps does not plan to enter into another contract to purchase any additional Hawk missiles or any other alternate missile at this time. However, based on the validity of targets assigned to the Marine Corps, we are actively monitoring NATO and other service efforts on all current and developing air defense systems for future consideration.

The effect on our operational readiness posture resulting from the termination of the Hawk contract is to reduce our acquisition objective of Hawk missiles from 69 percent projected under the original multiyear contract to 59 percent under the current arrangement.

QUESTIONS SUBMITTED BY SENATOR ALAN J. DIXON

R&D BUDGET/LAV

Senator DIXON. Last year you advised us that significant changes would be made to the LAV to incorporate the assault gun. Do you still agree that 105mm gun can be installed in the LAV without any changes to its LAV?

General GRAY. No significant changes will be made to the LAV baseline chassis in the LAV-AG development effort. Inherent characteristics of the LAV family will be maintained.

Senator DIXON. You also advised that the Army must agree to whatever selection of assault gun was made. Since the Army's 82nd Airborne Unit could be a prime user of this system to replace the older Sheridan vehicles, have you obtained agreement from the Army 82nd Airborne Unit to use the 105mm gun on the LAV?

General **Gray**. No agreement has been made with the U.S. Army. We have, however, opened a dialogue with the Army and they have acknowledged the benefits of a LAV-105 as a potential replacement for the M551. The Army continues to monitor the LAV-AG program.

Senator **Dixon**. Does the Marine Corps believe that a 105mm gun mounted on the LAV will be within the weight restrictions that you have for this system?

General **Gray**. Whether or not a LAV-105 will be within the weight restrictions for the LAV-AG is unknown at this time. The data received as a result of the market survey and our independent analysis will address this issue.

Senator **Dixon**. Since the Marine Corps requirements for a LAV assault gun is against "light armored vehicles", why does the Marine Corps require such a heavy weapon for this program as the 105mm?

General **Gray**. The Marine Corps requirement does not specify any gun solution. The gun selection has not been made. We will make our decision based on cost, schedule, and fulfillment of the requirement.

Senator **Dixon**. Will the LAV with the 105mm gun allow the mobility that the Marine Corps requires in performing its missions?

General **Gray**. The present LAV baseline chassis will essentially remain unchanged in the development of the assault gun. The selected cannon must satisfy Marine Corps operational requirements addressing air transportability, swimability and agility on the battlefield.

Senator **Dixon**. Does the Marine Corps intend to use the LAV with the 105mm gun in combination with its tank forces as a mission system?

General **Gray**. The LAV-AG is not an anti-tank weapon system and will not appear side-by-side with tank forces. The LAV-AG, however, will enhance the Marine Air Ground tank force's overall warfighting capabilities by complementing existing systems.

Senator **Dixon**. Can the LAV with the 105mm gun meet the requirement to be air-dropped from a C-130 aircraft as other systems are required?

General **Gray**. The market survey will provide some data on which to base an initial determination. Again, any LAV-AG will be required to satisfy the stated operational requirement. The LAV-25 has been "low altitude parachute extracted (LAPSED) from a C-130 with excellent results.

Senator **Dixon**. General Gray, based on data provided about this LAV-105mm assault gun program, it would appear that the Marine Corps will not be getting this system for some years. Why is it going to require such a time to get a LAV-Assault Gun system into the Marine Corps program since both the LAV and the gun are already developed?

General **Gray**. Program development is actually very short. We will proceed directly into full scale development in the first quarter of fiscal year 1990. The majority of the development time is required for gun, ammunition and turret safety certification so that development and operational testing can be conducted.

Senator **Dixon**. Why doesn't the Marine Corps consider another system that can be introduced into the Marine Corps as an interchangeable turret to the present LAV-25 in a much shorter time?

General **Gray**. The Marine Corps has considered "interchangeable" turrets; however, interchangeability is not an over-riding factor in the on-going analysis. Requirements for safety certification, type classification and man-rating of non-NATO/US standard guns and ammunition are the major factors in cost and scheduled development.

NAS GLENVIEW

Senator **Dixon**. General Gray, in discussions I have had with you and your predecessor, General Kelly, I have been concerned with the Marine Corps aviation unit HML 776, stationed at the Glenview, Illinois Naval Air Station.

Both you and General Kelly assured me this unit would be getting new helicopters to replace the old helicopters they have been presently using.

I would appreciate you giving myself and the committee an update on when this unit will be receiving these new helicopters.

General **Gray**. Our plan is to modernize the assault support helicopter force throughout the Marine Corps Reserve, which includes HML 776 at Glenview. The current austere fiscal environment has slowed our progress in this area. As soon as funding is available for additional people and airframes, we hope to resume our Reserve assault support modernization.

Questions Submitted by Senator John McCain

STRATEGIC REVIEW

Senator McCain. What kind of strategic review is now underway to establish the priority for Marine Corps forces and to examine whether the current Marine Corps share of the defense budget is correct?

General Gray. Currently there are no strategic reviews underway to establish the priority for Marine Corps forces and to examine whether the current Marine Corps share of the defense budget is correct. The National Security Council recently initiated a review of our basic national defense strategy that is expected to take into account the principal forces available to support the strategy. The NSC review has not yet, and may not be, developed to the degree of specificity implied in the question. Along the same lines, the Chairman, Joint Chief of Staff, initiated a strategy review in March 1989 that now is in abeyance pending the outcome of the NSC review. There are underway some studies and processes that address issues involving elements of Service forces, including the Marine Corps. The Chairman's Net Assessment for Planning (CNASP), done to support the Joint Strategic Planning Document fiscal years 1992–96 under a Memorandum of Policy for the Joint Strategic Planning System (JSPS), develops a set of decision alternatives for the President to select a fiscally constrained military strategy that supports national objectives. The CNASP currently identifies military options that address the disposition of some forward deployed Marine forces. It does not look at the priority of all Marine Corps forces against those of the other Services nor does it examine defense budget by share. The Joint Program Assessment Memorandum (JPAM) for fiscal years 1990–94 completed last summer, the Defense Review Board (DRB) process, and an ongoing Congressional Budget Office (CBO) study that assesses current Marine Corps programs against stated Marine Corps goals, each address PPBS issues concerning the Armed Forces. However, none of these studies focus upon the topics of Service force priority and correctness of defense budget share.

Senator McCain. Could you list the specific studies and planning efforts that have gone on within the OJCS and DOD to examine the value of the given roles and missions and possible changes in the share of the Defense budget going to the Marine Corps?

General Gray. The Department of Defense Directive 5100.1, *Function of The Department of Defense and its Major Components,* (September 25, 1987) is updated periodically to examine service functions, as evolved from their statutory roles and missions, but it does not examine the services' share of the defense budget. The ongoing Chairman's Report on Service Roles and Missions, required by the Defense Reorganization Act of 1986, addresses service roles and missions; considers changes in the nature of the threats faced by the United States, unnecessary duplication of effort among the Armed Forces and changes in technology that can be applied effectively to warfare. Any recommendations for changes in the assignment of functions the Chairman considers necessary to achieve maximum effectiveness of the armed forces are to be included. It does not address possible changes in Defense budget share for service forces.

ASSESSMENT AND THREAT ANALYSIS

Senator McCain. Could you describe the net assessment and the threat analysis that shape the Corps' force planning and budget planning, and summarize the major studies and planning efforts involved?

General Gray. In essence you have asked me how the force and budget planning are shaped by various studies and assessments. Our planning employs the Concepts Based Requirements System (CBRS). The vehicle by which we shape our forces and determine budget priorities is our Marine Air-Ground Task Force Master Plan (MMP). It links planning and budgeting. Furthermore, it is a mid range document which establishes objectives for the Marine Corps which can be achieved by means of doctrinal changes, training and education, equipment acquisition, changes to organizations for combat or all of these. This document defines how the Marine Corps will look and fight in the mid-term.

The MAGTF Master Plan receives vital input into it from sources internal and external to the Marine Corps. These inputs, in the forms of studies, assessments or other plans, shape the objectives of the Marine Corps found in the MMP.

I will begin by describing the input primarily from sources internal to the Marine Corps. The MMP being a definitive, mid range document is, to a great degree, developed from the Marine Corps Long Range Plan (MLRP). The MLRP provides broad concepts concerning how the Marine Corps will fight in the future. In doing so, it also establishes broad goals to achieve these futuristic operational concepts. It is important to note that the objectives found in the MMP are distilled from these goals in the MLRP. The MLRP itself is the result of input received from a number of documents to include: The Marine Corps Campaign Plan (MCCP), a threat assessment, an assessment of technological developments which may occur during the period, and finally a long range strategic assessment of the world environment. The last assessment is an annex of the Joint Strategic Planning Document (JSPD).

The external document which has a considerable influence on the MMP is the Joint Strategic Planning Document. It is a mid range document which is prepared by the Joint Chiefs of Staff. It provides strategic requirements and guidance which are used in Marine Corps force and budget planning. Another document which has considerable influence in the MMP's force and budget planning, is the Defense Guidance (DG). This document provides the most definitive external guidance concerning what is expected of Marine Corps forces in the mid range with regard to sustainability, readiness, and force structure.

MARINE CORPS CONTINGENCY CAPABILITIES

Senator McCain. Could you describe the main changes you hope to see in the contingency capabilities of the Marine Corps over the next 10 years, and how these capabilities will change by region?

General Gray. In conveying the intent of the Congress in enacting Public Law 416 of 1952, which insured the continuation of the Marine Corps as a *major military service* and a central component of national military capability, *House Report 666* envisioned that: "Such a force, versatile, fast-moving, and hard-hitting, will constantly have a very powerful impact . . . Such a ready force, highly mobile, always at a high state of combat readiness, can be in a position to hold a full-scale aggression at bay while the American Nation mobilizes its vast defense machinery."

Expanding upon the same theme, the Report approvingly quoted the testimony of then-Commandant General Clifton B. Cates to the HASC arguing for: ". . . a Marine Corps of such size and organization as to provide a balanced force in readiness for a naval campaign and, at the same time, a ready striking force for commitment to campaigns such as that in Korea. These forces would be used to withstand the initial phases of whatever action may confront this country while our vast defense machine regains the required momentum."

The contingency role of the Marine Corps thus described, firmly grounded in both the explicit intent of Congress and statutory enumeration of roles and missions (10 USC 5063), has remained clear and generally understood for forty years. Given its unique capabilities and missions, the role of the Corps is not projected to change *substantively* over the next decade. However, the changing nature of the national security and geopolitical environment will require a greater emphasis upon the *expeditionary* character of Marine forces; i.e., an emphasis upon inherent strategic and tactical mobility, readiness, and a hard-hitting and decisive capability across the full spectrum of military operations from military action short of war to general war.

The greater importance of the Corps' expeditionary character in the coming decade derives from several fundamental causes. The first is the interaction of a severely constrained fiscal environment with a sea-change in alliance relationships, leading to a possible draw-down of land (and possibly tactical air) forces currently forward postured in NATO and the Western Pacific. The second is increasingly diminishing overseas bases and overflight rights. And last is the political influence, natural resources, and "high-tech" military capabilities of emerging regional powers which are expected to increasingly challenge superpower interests, as well as correspondingly reducing their military and political leverage.

Thus, from the prospect of limited/general war in Europe and the Pacific, limited and low-intensity warfare in the Third World, and deterrence, presence, and other military action short of war, the effective contingency capabilities of the Marine Corps increasingly center upon its expeditionary character. Marine Forces must be capable of rapid and discriminate employment in a wide variety of missions. And while the prosecution of sustained general war will require a "total force approach, all will demand forces that are ready, flexible, mobile, sustainable, and decisive. These fundamental characteristics of Marine forces are conceived in global, *not* regional terms. As in the past, future regional peculiarities will be accommodated through the inherent flexibility of the Marine Air-Ground Task Force (MAGTF) to task organize its forces as a truly integrated air-ground-logistics team for the requirements of the specific region or mission at hand.

Effective Marine Corps contingency capabilities in the next decade—i.e., the Marine Corps as an effective instrument of national policy—depends upon success in two broad areas. The first is an expanded and rejuvenated understanding of the unique roles and missions of the Corps and its special contributions to the protection of vital U.S. interests which were clearly and explicitly envisioned by the Congress since the creation of the Corps as a major military service. These must be both protected in law and enhanced in the Functions Paper and in actual war and contingency planning. The second area is bringing to fruition the critical programmed modernization of those capabilities which directly enhance readiness, sustainability, mobility, and decisive combat power. These especially include the newer and faster classes of amphibious ships (e.g., LHD, LSD-41), and the ship-to-shore/tactical mobility enhancements of the LCAC, MV-22, and the Advanced Amphibious Assault Vehicle.

FUNDING CUTS

Senator McCain. What risks do you see in the funding cuts you have received in recent years?

General Gray. The nature of the Marine Corps missions and responsibilities require a careful balance between our force structure, readiness, sustainability, and sufficient modernization to field capable weapons and equipment. Through the recent funding cuts we protected readiness as much as possible, partially through altering our force structure within a reduced manning level, slowing our sustainability growth, and limiting modernization to only that which is absolutely necessary.

The largest risk within the recent cuts is the loss in capability represented by the reduction in our actual and programmed manpower strength. We feel nothing we can do gives the return on the nation's investment that our people do. It was a difficult decision, but to strike a proper balance between the Marines in our force, their training, weapons, equipment, and their support through housing and working conditions, we felt it necessary.

Senator McCain. How would these risks increase if you only got constant real funding over the next 5 years? If you saw funding fall by an annual average of 1 percent.

General Gray. No program growth over the period of the defense program (i.e., only increases to accommodate inflation) or real decline in resource levels will force a reduction in our force structure. This is necessary to provide proper equipment, training and support to our Marines, and maintain our overall readiness.

Senator McCain. What risks would occur if you had to take another major cut in end strength like the 2,900 man cut you took last year?

General Gray. Our manpower capability, or strength, recovers slower from a cut than any other capability. Those personnel, both officer and enlisted, not recruited in a given year become vacancies, with concomitent loss of service and experience, at higher ranks for many following years. Our experience during periodic wartime expansion demonstrates this tendency in the extreme.

If a reduction is forced too quickly, it must be taken from accessions, early termination of contracts, selective early retirement boards, and junior officers. This causes great force structure turbulence, creates an imbalance between junior and senior grades, and damages morale esprit. The longer the planning time available, the greater these risks can be eased.

We are finishing the implementation of our last force structure realignment, caused by the previous reduction. Imposition of another reduction will cause turbulence and inefficiencies in force structure, manning levels and the training establishment.

Short or long term, an end strength cut similar to the last reduction will affect our ability to support our mission commitments from a solid rotational base, and limit our ability to respond to various contingencies.

TO&E

Senator McCain. Could you provide us with the current TO&E of a typical MAGTF, MEF, MEB, and MEU/SOC and with the currently planned changes in that TO&E as of fiscal year 1994?

General Gray. The notional TO&E's for a MEF, MEB and MEU are submitted. At the end of each T/O a list of major end items is provided. When there will be significant changes to major end items by fiscal year 1994 they are explained in the notes. The actual MAGTF organized to accomplish specific missions may vary from the organizations depicted.

Glossary of terms

Assault Amphibian Battalion	Aslt Amphb Bn.
Combat Engineer Battalion	Combat Engr Bn.
Dental Battalion	DEN BN.
Engineer Support Battalion	Eng Spt Bn.
Force Imagery Interpretation Unit	FIIU.
Headquarters & Headquarters Squadron	H&HS.
Headquarters & Service Battalion	H&SBN.
Headquarters & Service Company	H&S CO.
Headquarters Marine Aircraft Group	HQMAG
Headquarters Battalion	HQ BN.
Headquarters Marine Aircraft Wing	HQ MAW.
Marine Heavy Helicopter Squadron (CH53 A/D)	HMH (A/D).
Marine Heavy Helicopter Squadron (CH 53E)	HMH (E).
Marine Light/Attack Helicopter Squadron	HMLA.
Marine Medium Helicopter Squadron	HMM.
Low Altitude Air Defense Battalion	LAAD BN.
Light Antiaircraft Missile Battalion	LAAM BN.
Landing Support Battalion	LDG SPT BN.
Light Armored Infantry Battalion	LAI BN.
Marine Aircraft Group (Fixed Wing)	MAG (FW).
Marine Air Control Group	MACG.
Marine Air Control Squadron	MACS.
Maintenance Battalion	MAINT BN.
Maintenance & Logistics Squadron	MALS.
Marine Air Support Squadron	MASS.
Marine Air Traffic Control Squadron	MATCS.
Medical Battalion	MED BN.
Motor Transport Battalion	MT BN.
Marine Wing Support Group	MWSG.
Marine Wing Headquarters Squadron	MWHS.
Marine Wing Support Squadron (Fixed Wing)	MWSS (FW).
Marine Wing Support Squadron (Rotor Wing)	MWSS (RW).
Reconnaissance Battalion	Recon BN.
Special Security Communication Team	SSCT.
Surveillance Reconnaissance Intelligence Group	SRI GROUP.
Supply Battalion	Sup Bn.
Marine Attack Squadron	VMA.
Marine Tactical Electric Warfare Squadron	VMAQ.
Marine Fighter Attack Squadron	VMFA.
Marine Tactical Reconnaissance Squadron	VMFP.
Marine Aerial Refueler Transport Squadron	VMGR.
Marine Observation Squadron	VMO.
Marine All Weather Attack Squadron	VMA (AW).

MARINE EXPEDITIONARY FORCE (MEF)

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
Command Element (CE):				
MEF command element	122	183	8	3
MEF H&S Co	9	108	2	3
SRI group	202	2,263	7	37
Total CE	333	2,554	17	43
Ground Combat Element (GCE):				
HQ BN, Marine Div	136	1,098	7	32
2 Infantry Regt	308	5,600	22	402
1 Infantry Regt	172	3,376	11	201
Artillery Regt	225	2,996	22	77

MARINE EXPEDITIONARY FORCE (MEF)—Continued

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
Tank BN	50	970	2	18
LAI BN	38	804	3	66
RECON BN	32	391	2	32
ASLT AMPH BN	47	1,097	2	20
Combat ENGR BN	43	814	2	15
Total GCE	1,051	17,146	73	863
Aviation Combat Element:				
HQ MAW	66	176	6	13
MWHS	8	123	0	1
SSCT	1	11	0	0
	0	0	0	0
Subtotal	75	310	6	14
MACG:				
HQ	41	148	5	23
MWCS	33	506	0	0
MACS	23	246	0	2
MATCS	23	305	0	2
MASS	33	184	0	1
LAAD BN	24	353	0	7
LAAM BN	21	467	2	11
Subtotal	198	2,209	7	46
MWSG:				
H&HS	14	58	9	65
MWSS(FW)	28	675	0	0
MWSS(FW)	28	675	0	0
MWSS(RW)	27	588	0	0
MWSS(RW)	27	588	0	0
Subtotal	124	2,584	9	65
MAG(FW) VMA/VMA(AW):				
HQ	23	77	0	0
MALS	26	819	4	4
VMA	36	207	1	3
VMA	36	207	1	3
VMA (AW)	32	176	1	3
VMA (AW)	32	176	1	3
Subtotal	185	1,662	8	16
MAG(FW) VMFA:				
HQ	23	77	0	0
MALS	26	741	4	4
VMFA	23	151	1	3
VMFA	23	151	1	3
VMFA	23	151	1	3
VMFA	23	151	1	3
Subtotal	141	1,422	8	16
MAG(RW) HMH/HMA/HMLA:				
HQ	23	77	0	0
MALS	25	716	4	4
HMH(A/D)	41	185	1	3
HMH(A/D)	41	185	1	3
HMH(E)	41	226	1	3
HMM	32	129	1	3
HMM	32	129	0	0

MARINE EXPEDITIONARY FORCE (MEF)—Continued

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
HMM	32	129	1	3
HMM	32	129	1	3
HMM	32	129	1	3
HMM	32	129	1	3
HMLA	63	257	1	3
HMLA	63	257	1	3
Subtotal	489	2,677	14	34
Other Attached FW:				
VMGR	49	267	1	3
VMFP	28	232	1	3
VMO	44	162	1	4
VMAQ	37	130	1	3
TAC/A//FAC/A	1	61	0	0
Subtotal	159	852	4	13
Total ACE	1,371	11,716	56	204
Combat Service Support Element:				
H&S BN	192	1,488	17	91
MAINT BN	58	1,762	2	2
SUP BN	58	1,292	6	80
ENG SPT BN	55	1,538	3	20
LDG SPT BN	42	934	1	1
MT BN	30	915	0	0
MED BN	6	233	132	628
DEN BN	0	5	75	153
Total FSSG	441	8,167	236	975
Total MEF	3,196	39,583	382	2,085

MAJOR END ITEMS

Ground Combat Element:	
M60A1 tanks [1]	70
81MM mortars	72
Dragon trackers	288
Tow launchers	144
AAV	208
LAV	147
M60 M6	601
155MM HOW (T)	72
155MM HOW (SP)	12
8" HOW (SP)	12
AN/TPQ 36 radars	5
60MM mortars	81
50 CAL M6	435
MK 19 40MM grenade launchers	345
Aviation Combat Element:	
AV8B	40
F/A 18	48
A6 [2]	20
EA6B	8
RF4B [3]	5
TA/OA4	9
KC130	12

MAJOR END ITEMS—Continued

OV10	12
CH53A/D [4]	32
CH53E	16
CH46 [4]	60
UH1	24
AH1	24
Hawk launchers [5]	24
Stinger teams	75

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[1] Will be replaced by 44 M1A1 tanks FY91–93.
[2] A6 mission will be assumed by F/A–18D.
[3] RF–4 mission will be replaced by F/A–18D.
[4] CH46 and CH53A/D will be replaced by MV22.
[5] Hawks will be reduced to 16 launchers.

MARINE EXPEDITIONARY BRIGADE (MEB)

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
Command Element (CE):				
MEB command element	57	122	5	8
DET SRI group	35	474	2	3
Total CE	92	596	7	11
Ground Combat Element (GCE):				
Infantry Regt	155	2,800	11	210
D/S Artillery BN (REIN)	65	1,026	3	12
Tank Co (REIN)	5	135	0	5
LAI Co (REIN)	9	148	0	4
Recon Co (REIN)	5	75	0	6
Aslt Amph Co (REIN)	7	230	0	4
Combat Engr Co (REIN)	5	137	0	4
DET TRK Co	3	73	0	0
Total GCE	254	4,624	14	245
Aviation combat element:				
MAW HQ DET	23	63	2	2
MWHS DET	6	132	2	3
SSCT	1	11	0	0
FIIU	1	11	0	0
Subtotal	31	217	4	5
MACG:				
H&HS DET	23	106	2	4
MACS	23	246	0	3
MATCS DET	4	72	0	0
MWCS DET	13	235	0	0
MASS DET	22	116	0	1
H&S DET(–) LAAM	9	182	2	3
Hawk Battery	6	140	0	4
H&S BTRY (–) LAAD	5	32	0	1
LAAD BTRY	5	141	0	2
Subtotal	110	1,270	4	18
MWSG:				
MWSS (FW)	28	672	2	16
MWSS (RW)	27	578	2	6
Subtotal	55	1,250	4	32
MAG (FW):				
HQ/MALS	41	[illegible]19	0	0

MARINE EXPEDITIONARY BRIGADE (MEB)—Continued

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
VMA	36	207	1	3
VMA (AW)	32	176	1	3
VMFA	23	151	1	3
VMFA	23	151	1	3
VMAQ	29	193	0	1
VMFP	17	176	0	1
VMGR	24	139	0	1
VMO	18	72	0	1
TAC (A)/FAC(A)	1	61	0	0
Subtotal	244	1,745	4	16
MAG (RW):				
HQ/MALS	40	401	4	4
HMM	32	129	1	3
HMM	32	129	1	3
HMM	32	129	1	3
HMM	32	129	1	3
HMH (E)	22	113	0	1
HMH (A/D)	41	185	1	3
HMLA	63	257	1	3
Subtotal	294	1,472	10	23
Total ACE	734	5,954	26	94
Combat Service Support Element:				
HQ (NUCLEUS)	9	15	1	2
DET, H&S BN	17	187	0	2
DET, MAINT BN	11	374	0	0
DET, SUP BN	7	189	2	15
DET, ENGR SPT BN	17	553	0	0
DET, LDGSPT BN	12	302	0	0
DET, MT BN	8	243	0	0
DET, MED BN	1	62	34	170
DET, DEN BN	0	0	24	49
Total BSSG	82	1,925	61	238
Total MEB	1,162	13,099	108	597

MAJOR END ITEMS

Ground Combat Element:	
M60A1 tanks[1]	17
81MM mortars	24
Dragon trackers	96
TOW launchers	48
AAV	47
LAV	36
M60 M6	255
155MM HOW (T)	24
155MM HOW (SP)	6
8" HOW (SP)	6
AN/TPQ-36 Radar	1
60 MM Mortars	27
50CAL MG	138
MK-19 40MM grenade launchers	114
Aviation Combat Element:	
AV8	20
F/A-18	24

MAJOR END ITEMS—Continued

A6 [2]	10
EA6	4
RF4 [3]	4
OA4/TA4	5
KC130	6
OV10	6
CH53A/D[4]	16
CH46 [4]	48
CH53E	8
UH1	12
AH1	12
Hawk launchers	6
Stinger teams	15

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[1] Replaced by 14 M1A1 FY91–93.
[2] A6 mission will be assumed by F/A–18D.
[3] Will be replaced by F/A–18D during mid 90's.
[4] Will begin to be replaced by MV–22 in mid 90's.

MARINE EXPEDITIONARY UNIT (MEU)

Unit	USMC		Navy	
	Officers	Enlisted	Officers	Enlisted
Command Element (CE):				
MEU command element	17	37	1	1
DET SRI group	4	103	0	3
Total CE	21	140	1	4
Ground Combat Element (GCE):				
Infantry BN (REIN)	50	1,073	3	67
Artillery BTRY (REIN)	12	223	0	3
Tank PLT (REIN)	1	26	0	0
LAI PLT (REIN)	1	28	0	0
Recon PLT (REIN)	1	25	0	0
ASLT AMPH PLT (REIN)	1	41	0	0
Det CMBT ENGR BN	1	45	0	0
Det TRK CO	1	33	0	0
Total GCE	68	1,494	3	70
Aviation Combat Element (ACE):				
HMM	32	129	1	3
HMH DET	9	71	0	3
HMLA DET	17	100	0	1
MWSS (RW) DET	2	67	0	0
MASS DET	4	17	0	0
LAAD SECTION	1	43	0	0
Total ACE	65	427	1	7
Combat Service Support Element:				
MSSG				
DET, H&S BN	7	58	0	2
DET, MAINT BN	1	33	0	0
DET, SUP BN	1	24	0	1
DET, ENGR SPT BN	1	61	0	0
DET, LSB	1	82	0	0
DET, MT BN	0	27	0	0
DET, MED BN	0	8	1	16
DET, DEN BN	0	0	1	2
Total CSSE	11	293	2	21
Total MEU	165	2,354	7	102

MAJOR END ITEMS

Ground Combat Element:	
Tanks (M60A1)[1]	5
81MM mortars	8
Dragon trackers	24
TOW launchers	8
AAVs	12
LAVs	6
155MM howitzers (T)	8
60MM mortars	9
50 CAL MG	20
60 CAL MG	50
MK19 40MM grenade launchers	26
Aviation Combat Element:	
CH53A/D/E [2]	4
CH 46	12
UH1	4
AH1	4
Stinger teams	15
AV8 note [3]	6

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[1] Replaced by 4 M1A1's in FY 91-93.
[2] CH46 and CH53A/D to be replaced by MV-22 in mid 90's.
[3] MEU (SOC) deploy with VMA DET.

CURRENT STRENGTH

Senator McCain. Could you provide us with a detailed statement of the current strength of the tactical air support, amphibious lift, and naval support forces affecting the Corps by major weapon system and with figures showing how this will change as of the end of fiscal year 1994?

General Gray. Tactical aircraft in the Corps will remain stable in numbers but improve in quality over the period you have cited. The active and reserve squadrons will have the following aircraft, which does not reflect the pipeline and training inventories held outside of these units:

TYPE AIRCRAFT	Fiscal year 1989	Fiscal year 1994
AV-8B	120	160
A-4M	99	48
F/A-18A/C	156	192
F-4S	24	0
A-6E	54	50
F/A-18D	0	56
EA-6B	22	24
RF-4B	21	0
OA/TA-4	60	0
KC-130	54	60
CH-46E	204	168
MV-22	0	36
CH-53A/D	98	48
CH-53E	64	80
AH-1	96	96
UH-1N	96	96
OV-10A/D	54	54
Total	1,201	1,168

Amphibious lift will grow from 66 ships carrying 80 percent of our defense guidance lift goal to 70 ships, carrying 94 percent of that goal. Also, the landing craft fleet will grow from 17 to 69 LCAC (Landing Craft, Air Cushion). We will accept delivery in this time frame of three LSD-41, one LSD-41CV (Cargo Variant), and three LHD-1 class ships, while three LSD-28 class ships retire.

Naval support forces other than the above, which come into play during amphibious operations, include carrier and battleship battle forces, escorts and naval surface fire support ships, construction, beachmaster and cargo handling units, naval special warfare forces and mine countermeasures units. None of these are dedicated to the amphibious force on a routine basis, and we forecast no particular change in the relative support over the period in question, with the exception of mine countermeasures. We anticipate that the USN will develop and field the Rapid Shallow Water Mine Clearance System, using their FY90-94 mine warfare budget line, even though this system does not have a budget line of its own.

CORPS' STRENGTHS AND WEAKNESSES

Senator McCAIN. Given these changes in force structure, what will be the major strengths and weaknesses in the Corps in fiscal year 1994 in terms of contingency capabilities in Asia, in the Persian Gulf and in Latin America.

General GRAY. I will begin by addressing the broad scope implications of your question and then narrow my answer. You have just mentioned some potential flashpoints in the Pacific Rim, an area where U.S. interests are ever increasing. Additionally, the Pacific basin includes a number of other potential flashpoints such as Korea, the Philippines, and as we saw this last year, Burma. In this vast area, the relatively small Marine Corps forces play a disproportionately large role in ensuring U.S. interests and maintaining stability in a number of regions. Marine Corps forces deployed aboard amphibious shipping serve as a strategically mobile reaction force. They can move unimpeded on the high seas to anyone of these potential flashpoints, as well as to any others that might arise. In the event they must be committed to a certain area, they can easily be reinforced by other Marine Corps forces forward based on Okinawa or centrally based in the U.S.

It is important to note that in this area that not only does geography vary with each potential region of crisis but so does the threat. We have, therefore, tailored our forces to be even more flexible with regards to the more likely contingencies. Our forces are light enough to operate from a sea-based posture and remain unencumbered by equipment and forces needed only in general war. From such a sea base, Marine Corps forces were able to respond to the crisis in the Persian Gulf. In the event that it would be necessary, Marine Corps forces could also execute a sea based counterinsurgency effort in the Philippines. At the same time we have equipped our forces to handle some of the more heavier threats found, ashore in Third World countries. It is important to point out that a proliferation of armor has occurred in a number of nations. Yet, Marine Corps forces are equally prepared for threats of this nature.

In tailoring our forces to this more likely conflict in the Third World, we have accepted some risks. We have placed in the Reserves, those units which cannot be deployed under 60 days. In the event of global war, we are expecting our forward committed forces to buy us time until mobilization can fully augment our forces.

MV-22

Senator McCAIN. You have described the V-22 as your number one aviation priority. I hear disturbing reports of a program that is behind schedule, with performance problems, and which could rise sharply in cost. Can you describe the steps you are taking to make the program manager and manufacturer aware that any further escalation in cost, and any further time and performance problems must result in major delays, if not outright cancellation?

General GRAY. The program manager and the manufacturer are keenly aware of the reported program delays and cost problems associated with the development of the V-22 OSPREY. However, as evidenced by the recent first flight and rapid completion of the initial flight envelope, the program is now progressing as planned. Cost escalation is always a major concern, however, the rise in unit cost of the V-22 is not attributable to performance problems and schedule delays but to changes in the quantity of aircraft to be procured by the services and the three year stretch-out of the program.

Senator McCain. Could you provide a detailed calendar of every change in cost, a major performance parameter, or meeting a major milestone and an explanation of the reason and the corrective actions taken.

General Gray. The change in cost can be seen through the annual budget submissions as reflected in the program's Selected Acquisition Reports (SAR's).

The fiscal year 1988/89 budget submission (Dec. 31, 1986 SAR) was based on competitive procurement of 913 aircraft with a rapid ramp-up to a 132 aircraft annual procurement. The procurement unit cost of the aircraft in this submission was $29.4M per aircraft or a total procurement cost of $26,865.9M.

The fiscal year 1989 amended budget submission (Dec. 31, 1987 SAR) was also based on a competitive procurement. However, the total procurement quantity was reduced to 682 when the Army dropped out of the program and the ramp-up was reduced to a maximum annual procurement quantity of 108 aircraft. The procurement unit cost of the aircraft in this submission was $30.5M or a total procurement cost of $20,829.0M.

The fiscal year 1990 budget submission (Dec. 31, 1988 SAR) was based on a sole source procurement from the team of Bell-Boeing. However, the total procurement quantity was again reduced to a total of 657 aircraft when the Air Force reduced the number of aircraft they intended to buy by 25 down to 55. Additionally, the program was stretched-out 3 years and the ramp-up was reduced to a maximum annual procurement quantity of 77 aircraft. The procurement unit cost of the aircraft in this submission was $35.0M or a total procurement cost of $23,020.9M.

The biggest cost drivers have not been programmatic problems or schedule/testing delays. The Army drop-out and the Air Force reduction coupled with the program stretch-out and reduced annual buy quantities have caused the largest problem in keeping the price of the aircraft down.

PROGRAM COST CHRONOLOGY

Fiscal year 1988/89 Budget Submission:
Competitive Procurement/Rapid Ramp-Up
Procurement Unit Cost based on 913 production aircraft: $29.426M
Procurement Cost Total: $26,865.9M

Fiscal year 1989 Amended Budget Submission:
Competitive Procurement/Rapid Ramp-Up
Procurement Unit Cost based on 682 production aircraft: $30.541M
Procurement Cost Total: $20,829.0M

Fiscal year 1990 Budget Submission:
Sole Source Procurement/Program stretched out 3 years
Procurement Unit Cost based on 657 production aircraft: $35.039M
Procurement Cost Total: $23,020.9M

Biggest drivers for increased costs are:

1. Army drop-out removing 231 aircraft from the program
2. Air Force reduction of 25 aircraft
3. Program stretched-out adding 3 years to program with reduced annual quantities
4. Change of acquisition strategy—Sole Source vice Competition

Senator McCain. What steps are underway to improve the performance of this program?

General Gray. There have been no changes to the performance parameters of the aircraft. The contractor is still required to meet all performance specifications as required by the contract. It is currently felt that the contractor will be unable to meet the performance specs without removing weight from the aircraft. A weight reduction program is in process.

Now that the first flight has occurred and the initial flight envelope completed, rapid improvement progress should be seen in the V-22 program's performance. No additional steps or incentives are necessary to improve the performance of this program.

Senator McCain. What level of increase in real cost would lead you to rethink the program?

General Gray. The present competitive acquisition strategy for the V-22 should provide sufficient cost controls/cost avoidance to maintain costs in an affordable range. If unforeseen circumstances drive the costs up significantly higher then current estimates, then we will have to rethink our procurement strategy.

Senator **McCain**. In contrast to the V-22 Program, the multiyear procurement of the AV-8B seems to be on track. How much money has this program saved? What lessons do you feel the Corps, experience with the AV-8B poses for the Air Force's choice of a new close air support aircraft?

General **Gray**. The multiyear procurement of the AV-8B is 72 aircraft at 24 per year for fiscal year 89-91. Although the contract is still being negotiated, it is estimated that the savings projected over 3 individual years of procurement will be $123.7M or 12.1 percent. The Marine Corps requirement for the AV-8B is based on the need for rapid, flexible response for an expeditionary force. The AV-8B supports the combined arms concept that allows the Marine Corps to be a force in readiness that is light enough to be highly mobile, responsive to the needs of the combat element, gets to the fight quickly, with sufficient combat power to prevail over an adversary. The choice of a close air support aircraft for the U.S. Air Force should be based on their mission requirements.

ADEQUACY OF CURRENT AMPHIBIOUS LIFT

Senator **McCain**. Can you tell us about the adequacy of our current amphibious lift and whether you have the necessary flexibility and sustainability that lift provides, and what the current FYDP will do to provide that lift?

General **Gray**. Through this budget year, we have provided for an amphibious force capable of lifting a Marine Expeditionary Brigade (MEB) in each fleet as well as the forward deployed Marine Expeditionary Unit (MEU) in the 6th and 7th Fleets. Moreover, we have achieved significant upgrades in the C3, intelligence, aviation support and aviation safety for the amphibious ships. We are more ready now than in any recent peacetime period to conduct MEB sized amphibious operations in each ocean as a result. These amphibious operations in the near term will be conducted in the main from near shore (under 20 miles distance) launching stations. I anticipate that in the near term period, we will achieve the first stage of an over-the-horizon (in excess of 25 miles distance) amphibious operations capability. That evolution, which depends on the production of sufficient new landing craft and tilt-rotor aircraft, has become necessary to overcome the present threat.

In the long term, I hope that we will achieve the defense guidance objective of amphibious lift for the assault echelon of a Marine Expeditionary Force (MEF) and a MEB, with a concomitant over-the-horizon capability that is developed fully. This is really a reduced, fiscally-constrained goal, since the real requirement for us is the lift for a MEF assault echelon in each fleet. Only the MEF amphibious capability gives us a clear military advantage over potential adversaries, because of the combat power and operational endurance that it bears. I am confident that we can execute the necessary shipbuilding and production of aircraft and landing craft to make this force a reality in the late 1990's. If we accomplish this, we will have achieved the conventional strength and strategic flexibility that the previous administration set as its goal in the early part of this decade. The task ahead is not easy, and a reasonable priority must be assigned to amphibious forces to make it happen. It is a worthy goal from which we must not shirk.

The current FYDP adds only one LHD-1 class and four LSD-41 cargo variant class ships, the former a result of the present four-year hiatus in construction of this most capable class. Construction of the LCAC continues at nine per year. As a result of this plan, we will attain the defense guidance lift objective in 2003, vice 1996.

Senator **McCain**. Given these changes in force structure, what will be the major strengths and weaknesses in the Corps in FY1994 in terms of contingency capabilities in Asia, in the Persian Gulf and in Latin America.

General **Gray**. I will begin by addressing the broad scope implications of your question and then narrow my answer. You have just mentioned some potential flashpoints in the Pacific Rim, an area where U.S. interests are ever increasing. Additionally, the Pacific basin includes a number of other potential flashpoints such as Korea, the Philippines, and as we saw this last year, Burma. In this vast area, the relatively small Marine Corps forces play a disproportionately large role in ensuring U.S. interests and maintaining stability in a number of regions. Marine Corps forces deployed aboard Amphibious shipping serve as a strategically mobile reaction force. They can move unimpeded on the high seas to anyone of these potential flashpoints, as well as to any others that might arise. In the event they must be committed to a certain area, they can easily be reinforced by other Marine Corps forces forward based on Okinawa or centrally based in the U.S.

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In tailoring our forces to this more likely conflict in the Third World, we have accepted some risks. We have placed in the Reserves, those units which cannot be deployed under 60 days. In the event of global war, we are expecting our forward committed forces to buy us time until mobilization can fully augment our forces.

Senator KENNEDY. I want to thank you very much for your appearance here. It has been very, very interesting, as always, and we will look forward to continuing to work with you in the future.

The committee is adjourned.

[Whereupon, at 11:44 a.m., the subcommittee adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

THURSDAY, APRIL 20, 1989

U.S. Senate,
Subcommittee on Projection Forces
and Regional Defense,
Committee on Armed Services,
Washington, DC.

SUBMARINE SHIPBUILDING AND RELATED TECHNOLOGY

The subcommittee met in open session at 3:24 p.m., Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Exon, Dixon, Cohen, McCain, Gorton, and Lott.

Professional staff member present: Norman G. Mosher.

Minority staff members present: Patrick A. Tucker, minority staff director and counsel, and Mark B. Robinson, professional staff member.

Staff assistant present: Lori M. Jackson.

Committee members' assistants present: Jeffrey B. Subko, assistant to Senator Exon; Terrence M. Lynch, assistant to Senator Shelby; Dale F. Gerry, assistant to Senator Cohen; Anthony H. Cordesman, assistant to Senator McCain; Robert M. Soofer, assistant to Senator Gorton, and Charles Pearcy, assistant to Senator Lott.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator Kennedy. I am pleased to welcome our witnesses to this hearing on the Nation's submarine forces. Currently, the Nation has three submarine programs: the SSN-688, the new SSN-21, and the Advanced Submarine Technology Program. The committee will examine the status of each of these programs during today's hearings.

The SSN-688 program is coming to a close. It began in 1971 and 61 submarines of this class have been authorized. Many improvements have been made as the program has progressed and the last ships of this class are vastly more capable than the first.

These submarines are still under construction or on order in the shipyards, and I asked the Secretary of the Navy to supply for the record answers to the following questions: What is the nature and the extent of reported cost overruns associated with the 688 proram? Will this program require additional funding above that previously authorized and appropriated?

[The answers from the Secretary of the Navy follow:]

Department of the Navy,
Office of the Secretary,
Washington, DC, April 20, 1989.

Hon. Edward M. Kennedy,
Chairman, Subcommittee on Projection Forces and Regional Defense, Committee on Armed Services, U.S. Senate, Washington, DC.

Dear Mr. Chairman: The attached information responds to your letter of April 11, 1989, in which you requested that certain information be provided to the subcommittee prior to its hearing on the Navy's submarine shipbuilding program and related technology, scheduled for April 20, 1989. I am providing that information for Secretary Ball.

The other issues discussed in your letter will be addressed at the hearing by Vice Admiral Dan Cooper, the Assistant Chief of Naval Operations (Undersea Warfare).

Sincerely,

H. Lawrence Garrett III,
Under Secretary of the Navy.

Attachment.

Senator Kennedy. What is the nature and extent of reported cost overruns associated with the SSN-688 building program?

Secretary Garrett. The term "overrun" is somewhat misleading in the context of these contracts. The Navy recognized that many of these contract prices were optimistic and that target costs could be exceeded. Although the aggressive price competition has therefore contributed to over target cost increases, the Navy believes that the final price to be paid will be lower than that which would have been paid in the absence of competitive bidding. The over target cost projection of the 26 SSN-688 submarines under contract for construction is $1,842,000,000. The government's share of the over target cost increase for these 26 ships is $727,200,000 (for $27.96 million per ship, which is 9.92 percent of the current contract target price.) These over target cost increases are attributable to a number of causes. First, the two shipbuilders, Electric Boat and Newport News Shipbuilding have actively competed for the contracts to build these submarines. These were Fixed Price/Incentive (FPI) contracts with a 50-50 shareline. As the contractor exceeds target cost, he and the government share equally in the over target cost increase. The Navy believes that both shipbuilders have made aggressive business decisions in the proposal pricing process. Additionally, the strike at Electric Boat and problems at Newport News Shipbuilding in utilizing the new modular construction facility have contributed to the over target cost increases. The impact of the strike at Electric Boat is not yet fully defined and there is some indication that further over target cost increases are possible.

Senator Kennedy. Will this problem require an additional funding above that previously authorized and appropriated?

Secretary Garrett. There are sufficient funds within the SCN account to cover cost growth on SSN-688 class submarines. We have budgeted for reserves above target cost in recent awards. In the past, where we had budgeted to cover potential cost growth within appropriated end cost, Congress has removed some of this reserve in years following the appropriation. During the 1989 Ship Cost Adjustment, we will review the cost situation on each program and make appropriate adjustments. The SCA is not yet completed, but we expect that assets from other programs will be used to cover cost growth in the SSN-688 program. GAO reviewed shipbuilding costs last year and again this year, and their independent conclusions have not indicated that additional SCN funds are required to cover this cost growth.

Senator Kennedy. Last year Congress approved construction of the SSN-21 as the first in a new class of nuclear attack submarines. Two issues concern the committee.

The Comptroller General has found that the "fly before buy" provisions of law apply to the program. Operational testing requirements must be met before full production proceeds. For the SSN-21, this would mean that no further SSN-21's can be built until the first one goes to sea and is tested in 1995. Today we should explore whether this law needs to be adjusted to take account of this type of a program.

The second issue is a review of the BSY-2 Combat System, the technological development likely to pace the whole program. I asked the General Accounting Office to examine what technical challenges confront the Navy in its development. The GAO replied in the form of a short report which is available to the members and the public.

In this hearing I have asked the Navy to inform us how they plan to address the risks inherent in the development of this new combat system.

Two years ago Congress initiated the Advanced Submarine Technology program to prepare for the next generation of submarines after the SSN-21. We allocated $100 million for this program in 1988 and again in 1989. Today we want to review the progress of that program to assess whether it merits continued funding at this level.

Finally, in this era of declining defense budgets, we need to be especially careful to protect both the quality of our people and the quality of our technology. There are few places in our defense establishment where quality can be measured so directly and expressed so dramatically as in our submarine force.

But it is a fragile and perishable advantage we enjoy presently. We must, in my view, maintain our qualitative edge, and that means we must reject short-sighted cost reduction measures that would jeopardize our ability to keep up the pace of modernization or undermine the quality of our personnel.

I want to make one further point. We know from the tragic accident on board the *Iowa* yesterday that even the peacetime risks of the military service are extraordinary. Our hearts and prayers go out to the victims of that tragedy and their families. We intend to do all we can in this committee to determine what went wrong and to provide as much protection in the future as possible.

The Soviet Union recently lost one of its own submarines in an accident off the northern coast of Norway. It is obvious that risks of service at sea are substantial. Sailors are in peril both on the sea and under the sea.

Today, I welcome Vice Adm. Dan Cooper, Assistant Chief of Naval Operations for Undersea Warfare, and Mr. Robert Moore, the Deputy Director for Systems and Technology in the Defense Advanced Research Projects Agency. Each of the principal witnesses has brought assistants.

My intention is to keep this hearing open to the greatest degree possible. If necessary, we will have a closed session at the end of the hearing.

Senator Cohen.

Senator **Cohen**. Mr. Chairman, you have summarized the issues. I welcome both of our witnesses, and would inquire, since we have only two witnesses, how many does each have in the way of assistants here in this room full of people?

Admiral **Cooper**. I brought three assistants.

Mr. **Moore**. Three.

Senator **Kennedy**. Do you want to introduce them?

Admiral COOPER. Yes, sir. The first one is Admiral Firebaugh, who is the Project Manager for SSN-21. The second one is Admiral Evans, who is the Director of Advanced Submarine Research and Development. And the third one is Admiral Volgenau, who is the Director of Submarine Combat Systems.

Mr. MOORE. I would like to introduce Dr. Ron Clark, who is Director of DARPA's Naval Technology Office; Dr. Tom Taylor, who is his Deputy; and Captain Marc Pelaez, a submariner who is the Director of our Advanced Submarine Technology program.

Senator KENNEDY. At the outset, Admiral Cooper, Admiral Firebaugh, I want to thank you just personally for all the help that you provided to me last Monday, going up and visiting Quonset and also Groton, and seeing the continued progress that is being made on the 688's and the SSN-21. It was very helpful and I want to thank you very much for all the assistance that you provided.

I would now like to have Senator Dixon's statement inserted into the record.

PREPARED STATEMENT OF SENATOR ALAN J. DIXON

I would like to begin by saying that I am looking forward to serving on this outstanding committee that is so ably chaired by my good friend and distinguished colleague, Senator Ted Kennedy of Massachusetts. Having discussed the issues of this committee at the full committee level, I am familiar with several of the problems we face and accept the challenge of solving them.

Today this committee will hear testimony on submarine shipbuilding and related technology from a panel of expert witnesses. Their testimony before this committee could not be more timely as our submarine program is plagued by a number of problems while the Navy's antisubmarine warfare capability vis-a-vis the Soviets is declining.

The problems the committee will discuss here today in many ways typify those that we have in several weapons programs. Our current attack submarine—the *Los Angeles* class—has incurred cost overruns for several years and I understand that these overruns may cost the Navy an additional $1 billion. The procurement of our next generation attack submarine—the *Seawolf* class—is being rushed, according to critics, at a time when its combat system has experienced delays and other problems. Moreover, the Defense Department's Inspector General's office says that the Navy underestimated the Soviet threat for the submarine.

Another problem is that the Reagan budget did not include funds for a congressionally directed Advanced Submarine Research and Development Program under the Defense Advanced Research Projects Agency (DARPA). At a time when Soviet submarine advances are multiplying, I strongly recommend to the Secretary of Defense that he request the $100 million for this program that the legislation calls for.

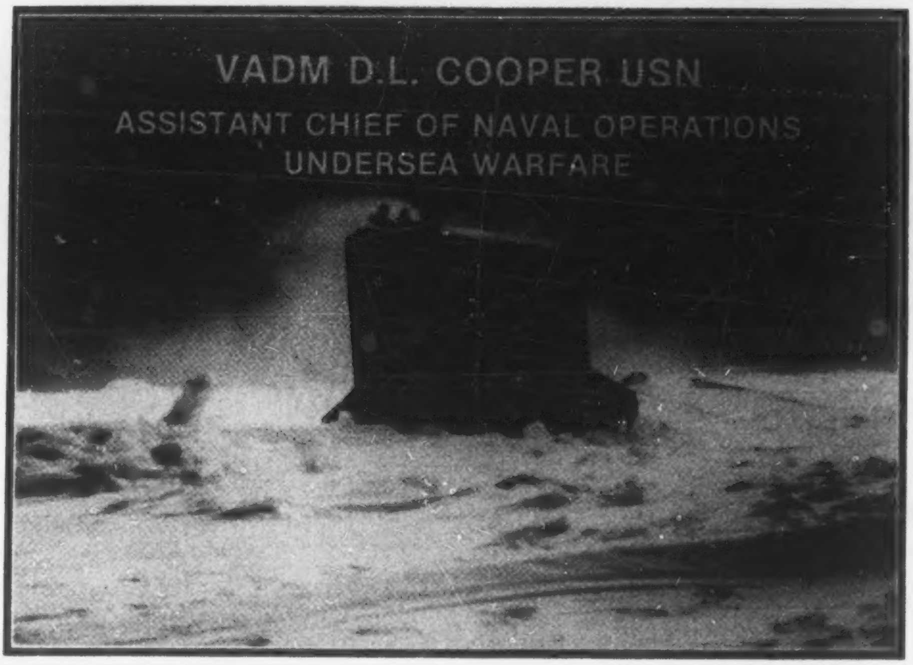
Mr. Chairman, our witnesses here today can contribute greatly to our understanding of these complex problems. I look forward to their testimony.

Senator KENNEDY. Would you like to proceed, Admiral Cooper?

STATEMENT OF VICE ADM. D.L. COOPER, U.S. NAVY, ASSISTANT CHIEF OF NAVAL OPERATIONS FOR UNDERSEA WARFARE, ACCOMPANIED BY ADMIRAL FIREBAUGH, PROJECT MANAGER, SSN-21; ADM. THOMAS EVANS, DIRECTOR, ADVANCED SUBMARINE RESEARCH AND DEVELOPMENT; AND ADM. D. VOLGENAU, DIRECTOR, SUBMARINE COMBAT SYSTEMS

Admiral COOPER. Yes, sir. Thank, you, Mr. Chairman. I would appreciate it if my statement could be entered into the record and I would also like to give a presentation covering the status of our submarine force.

Senator KENNEDY. It will be included. All the statements will be included in the record.



VADM D.L. COOPER USN

ASSISTANT CHIEF OF NAVAL OPERATIONS

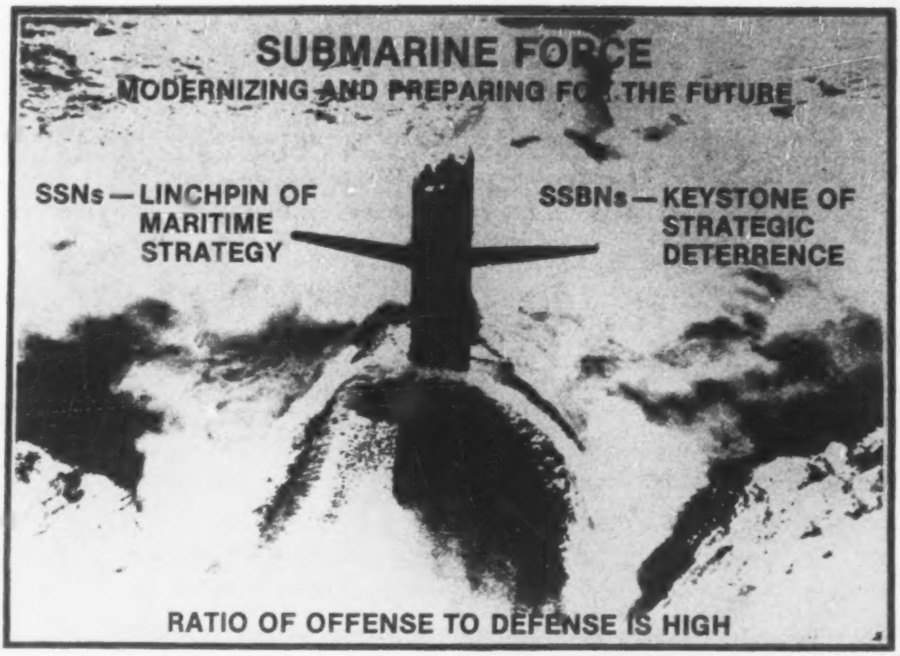
UNDERSEA WARFARE

Admiral Cooper. The submarine force today is modernizing and preparing for the future. I will briefly talk about the SSBN role in strategic deterrence and unless there are questions, I will concentrate on the attack submarine programs.

The Trident submarine with the D–5 missile will have the capability of covering the full target spectrum. The Trident submarine is absolutely survivable. The Navy and other outside agencies study SSBN survivability on a daily basis and their conclusions provide the high degree of confidence in the security of our strategic submarine force.

The attack submarines are the linchpin of the national maritime strategy. If world tensions were to increase, our SSN's would deploy immediately and move forward into the enemy's home waters.

[Slide No. 2.]



SUBMARINE FORCE

MODERNIZING AND PREPARING FOR THE FUTURE

SSNs — LINCHPIN OF MARITIME STRATEGY

SSBNs — KEYSTONE OF STRATEGIC DETERRENCE

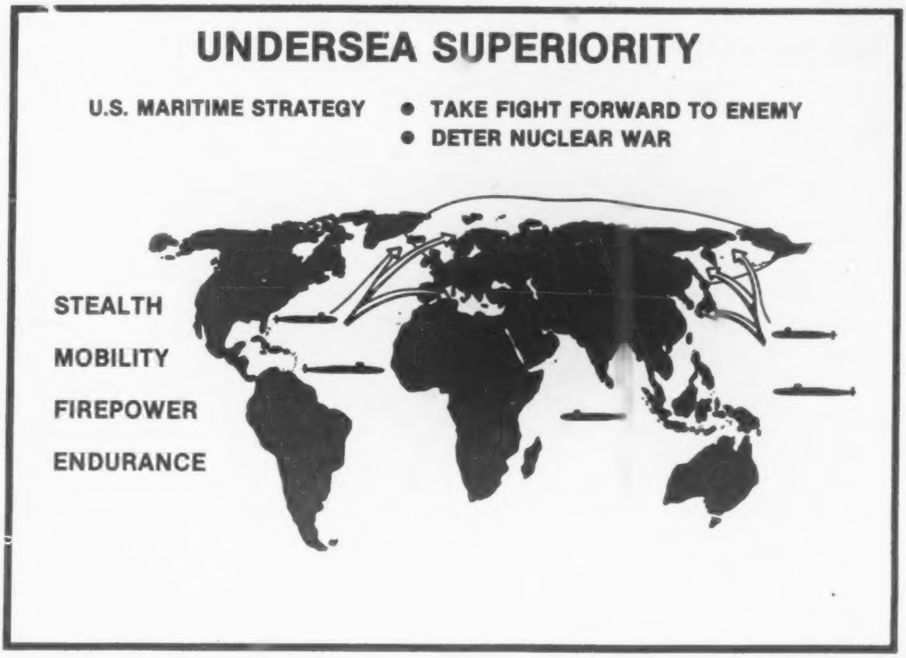
RATIO OF OFFENSE TO DEFENSE IS HIGH

One thing I want to emphasize is the point that the submarine force is evaluating R&D programs with a three-pronged approach in mind. First, in the near term, we are looking at ways to best equip our submarines that today's submarines have to face the threat. A perfect example is the SSN–688 class improvement program. With the thousands of improvements made the SSN–688 is, unarguably the best class of submarines in the world.

The second is, what we are doing to ensure superiority against the midterm threat, that is between 1995 and 2010. The SSN–21 is designed to meet this threat and will ensure submarine superiority well into the 21st century.

The final approach is to ensure a well planned R&D program is in place to enable us to go against what we think might be the futuristic threat.

[Slide No. 3.]



UNDERSEA SUPERIORITY

U.S. MARITIME STRATEGY
- TAKE FIGHT FORWARD TO ENEMY
- DETER NUCLEAR WAR

STEALTH

MOBILITY

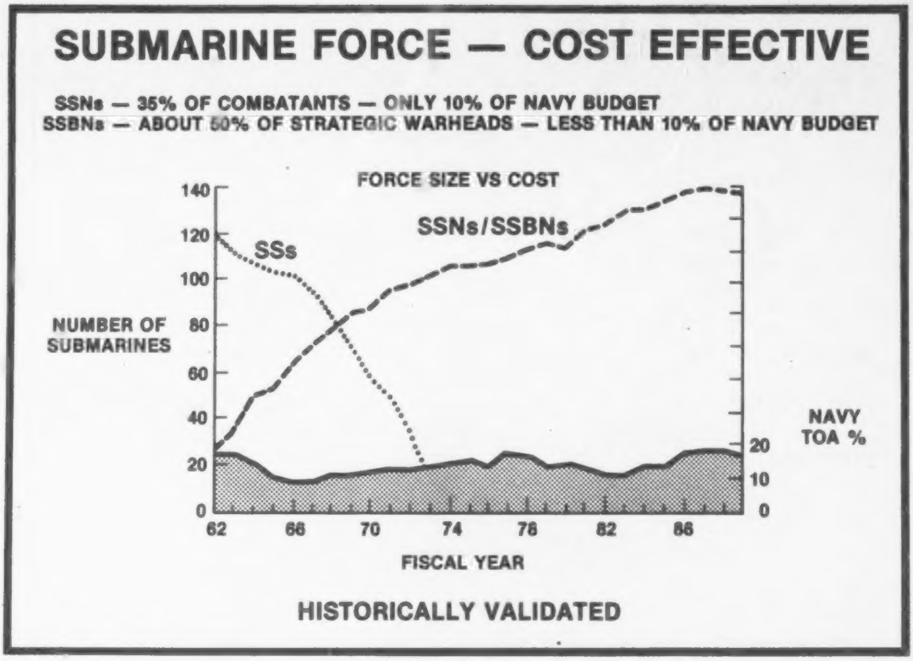
FIREPOWER

ENDURANCE

Undersea superiority is essential to our national maritime strategy. As DEFCON increases, SSN's will move up into the enemy's bastions or wherever the enemy might operate. The strategy is to maintain the sea lines of communication open and also to minimize exposure of our surface forces in these areas. The SSBN's meanwhile, because of their increased missile range capability, operate in all of the Atlantic, all of the Pacific, and can operate in the Indian Ocean.

The point I want to make here is one of the concerns you hear these days is that the Soviets will operate in their bastions and therefore be safe. The fact is their bastions are quite small and localized when compared to the capability that we have in operating in all the world's oceans.

[Slide No. 4.]



SUBMARINE FORCE — COST EFFECTIVE

SSNs — 35% OF COMBATANTS — ONLY 10% OF NAVY BUDGET
SSBNs — ABOUT 50% OF STRATEGIC WARHEADS — LESS THAN 10% OF NAVY BUDGET

HISTORICALLY VALIDATED

The submarine force is cost effective. In 1962 we had 122 diesel submarines, we now have about 130 nuclear submarines. We have accomplished that transition, on about 18 percent of the Navy's total budget or less.

The basis of this accomplishment is improvements in our overhaul policies, implementing system commonality, ensuring that the systems on all the ships are the same when feasible and also carefully controlling our manpower requirements.

[Slide No. 5.]

THE THREAT

"THE PRINCIPAL SHIP IN THE SOVIET NAVY IS THE SUBMARINE"

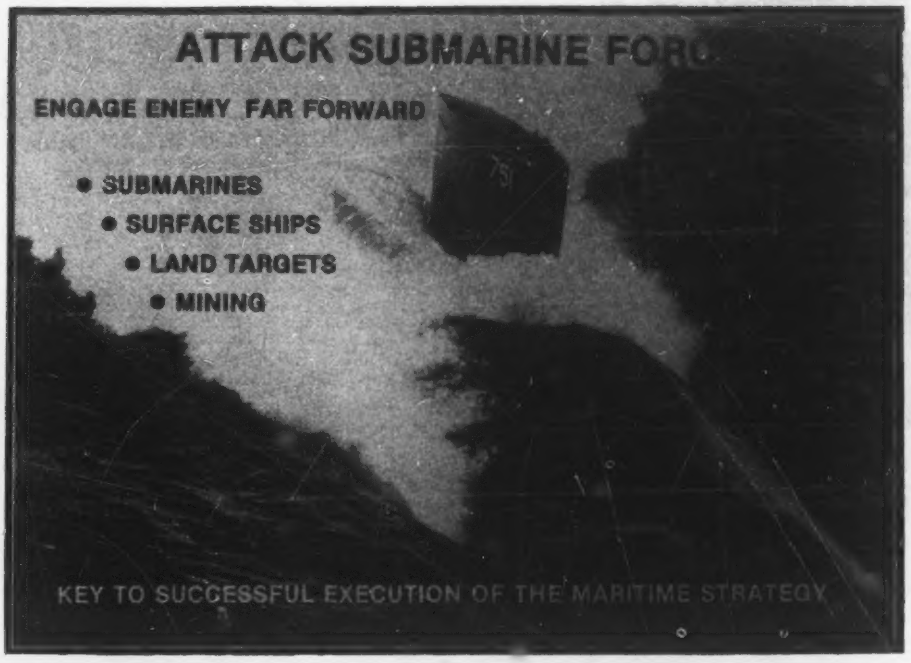
This slide is a picture that most of you have seen. This is Secretary Gorbachev on a Typhoon. The Typhoon submarine is in fact about 50 percent larger than the largest submarine we have, the Trident.

That represents the threat. The principal ship of the Soviet Navy is the submarine. Today we believe that the Soviets are building fewer submarines than we previously projected. Ten years ago, when we projected they would build 10 or 12 a year. They are now only building six or seven a year, which is still two to three times what we are building.

We also know that the Soviets have made some strides in their submarine capability that we did not expect. They are not revolutionary strides, they are evolutionary.

We still think we have a good margin of superiority, but the fact is they have made some strides that we did not expect them to.

[Slide No. 6.]



ATTACK SUBMARINE FOR

ENGAGE ENEMY FAR FORWARD

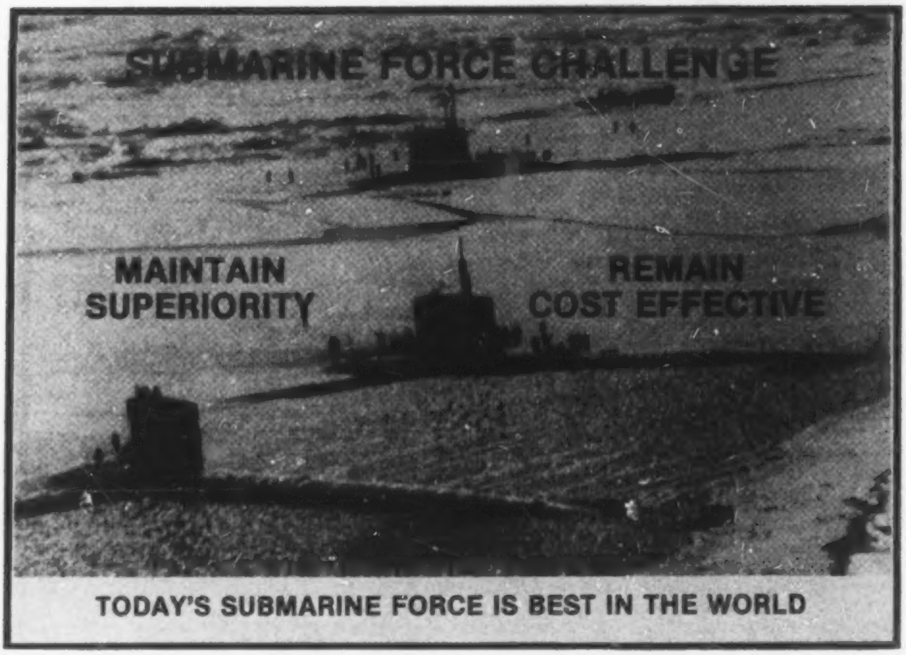
- SUBMARINES
- SURFACE SHIPS
- LAND TARGETS
- MINING

KEY TO SUCCESSFUL EXECUTION OF THE MARITIME STRATEGY

The submarine attack force, as I mentioned, is designed to engage the enemy far forward. The primary missions of the submarine force are: ASW, anti-submarine warfare; ASUW, anti-surface warfare; and with the Tomahawk land attack missile strike warefare; and of course we have mining.

The submarine has great leverage by virtue of its stealth, its ability to deploy without people knowing the number in place or where they are. As I tell my own people, we have had stealth ever since the first time we submerged, we just did not know how to spell it.

[Slide No. 7.]



SUBMARINE FORCE CHALLENGE

MAINTAIN SUPERIORITY

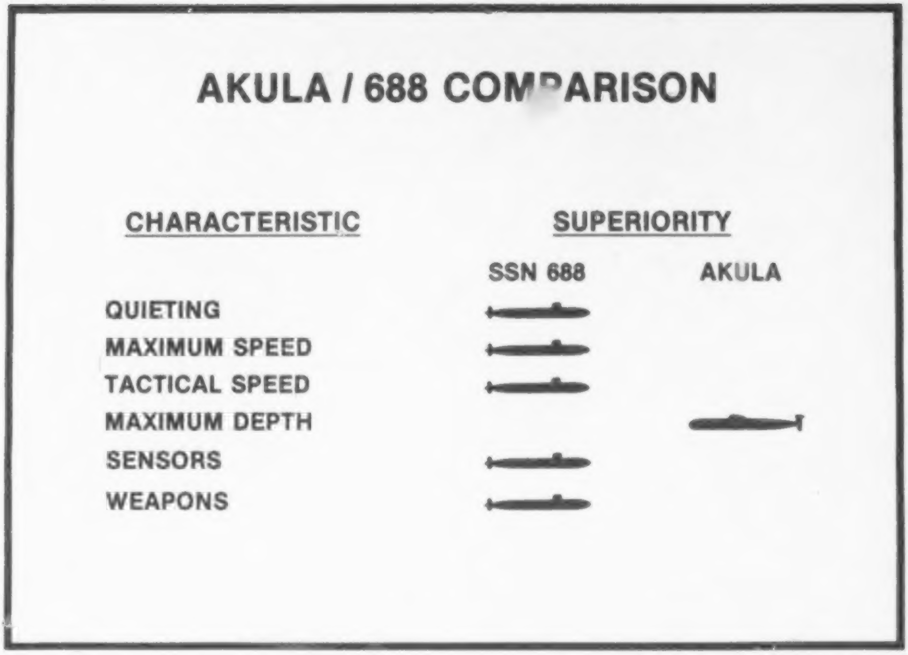
REMAIN COST EFFECTIVE

TODAY'S SUBMARINE FORCE IS BEST IN THE WORLD

The submarine force challenge is to maintain undersea superiority. This picture was taken 3 years ago in the Arctic. As you know, every year we go up to the Arctic, to perform various evolutions, such as shooting torpedoes to ensure that we can operate in that environment. That year three submarines operated together for the first time.

The submarine force must also remain cost effective. The fact is that 55 percent of our annual budget goes toward readiness and training. Readiness and training goes toward operating and also overhauling the ships.

[Slide No. 8.]



AKULA / 688 COMPARISON

CHARACTERISTIC	SUPERIORITY	
	SSN 688	AKULA
QUIETING	▬	
MAXIMUM SPEED	▬	
TACTICAL SPEED	▬	
MAXIMUM DEPTH		▬
SENSORS	▬	
WEAPONS	▬	

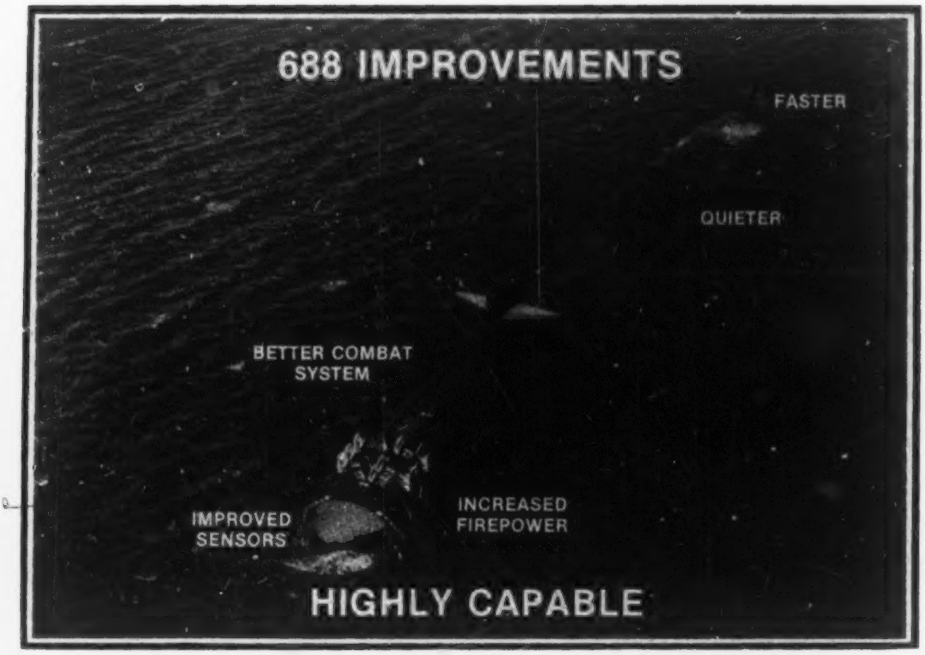
We attempt to do everything we can to maintain technical superiority. I am comparing the capabilities of the *Akula*, which is the newest submarine the Soviets have and the one with which we have expressed some concern, with the original 688. This is not the improved 688. As you can see, the SSN-688 is far superior.

Two characteristics that people claim the Soviets are superior are maximum speed and depth. The fact is, the 688 even before it was improved, could go faster than the *Akula* can go. It cannot go deeper. We have weapons that can go as deep and deeper than *Akula*. We feel our present depth capability can go as deep as we need to go.

The fact is that quieting is the most important parameter in submarine design, although we sometimes discuss maximum speed. Tactical speed is the speed that you can make and still hear the other guy before he can hear you and that is what is important in submarine warfare.

We feel our sensors and weapons are better. I will talk a little bit about those later.

[Slide No. 9.]



688 IMPROVEMENTS

HIGHLY CAPABLE

We have made significant improvements to the 688 which have resulted in the improved 688 class submarine which we are building right now. The first two of those are in commission, the U.S.S. *San Juan* (SSN-751) and the U.S.S. *Pasadena* (SSN-752).

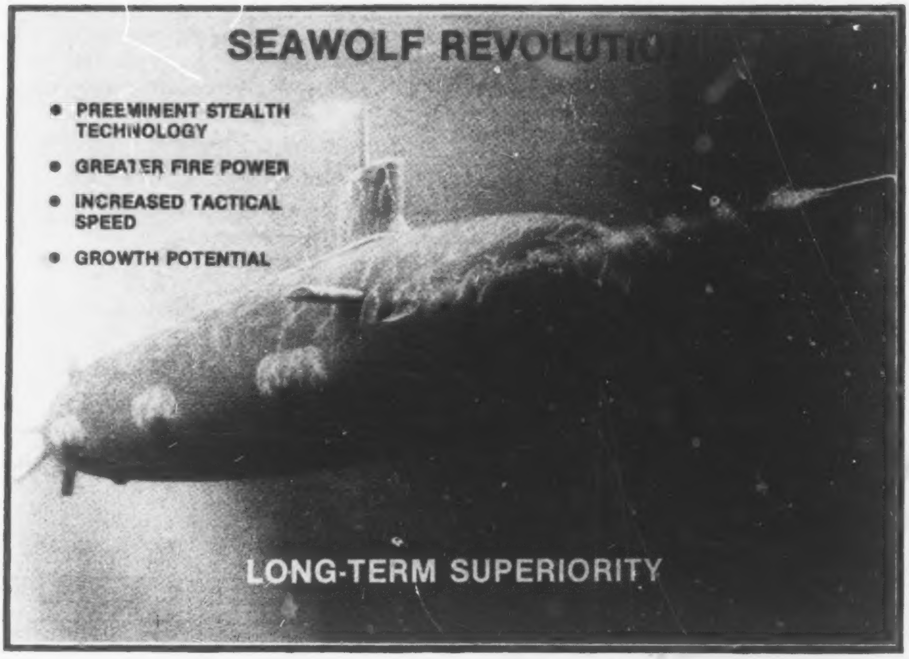
They are quieter and faster with an improved propulsion plant. We have utilized improved hull quieting techniques on board. An improved combat system has been developed for the I-688. The BSY-1 Combat System, which is the first submarine combat system that integrates the sensors and the fire control system. It is also the precursor, by the way, to the BSY-2 which will be installed on the SSN-21.

We have increased the improved SSN-688's firepower by putting in 12 vertical launch tubes that will launch the Tomahawk land attack missile and also the Tomahawk anti-ship missile. We have also improved the submarine's sensors.

This slide does not show the fact that in the improved SSN-688 class we have taken the fairwater planes here and put them down on the bow. That was a factor in obtaining Arctic capability for the I-688 class submarines.

We have made thousands of improvements in the 688 class submarines and feel that this improved class submarine is in fact two times better than the original 688 we started building in 1970.

[Slide No. 10.]



SEAWOLF REVOLUTI

- PREEMINENT STEALTH TECHNOLOGY
- GREATER FIRE POWER
- INCREASED TACTICAL SPEED
- GROWTH POTENTIAL

LONG-TERM SUPERIORITY

This slide depicts the *Seawolf* revolution. The program was structured to incorporate the latest in advanced technologies that would come to fruition in the timeframe the first *Seawolf* delivers. There is nothing we can see on the horizon today that we could incorporate into the *Seawolf* to make it any better than it will be right now.

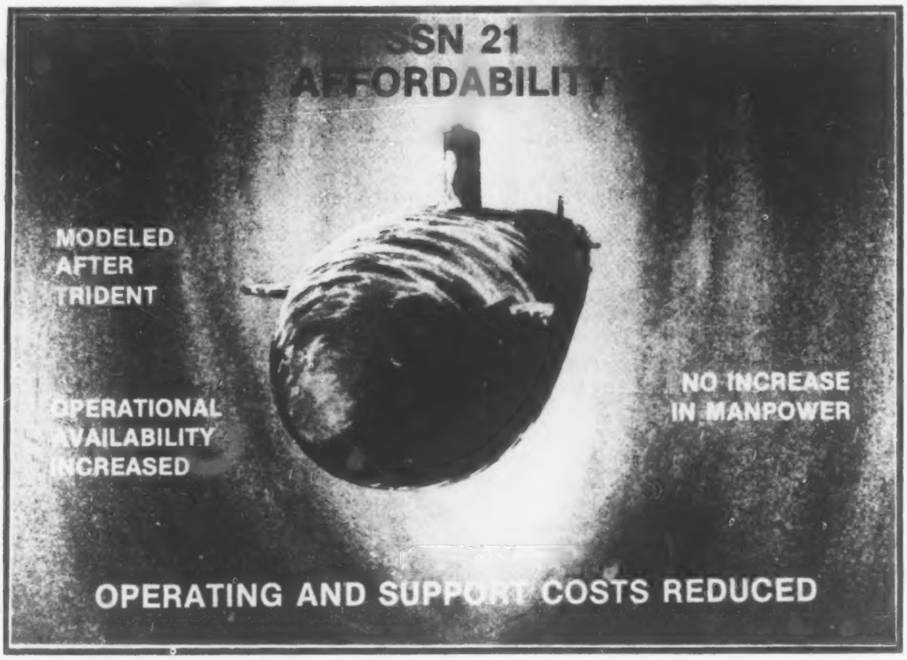
Seawolf will incorporate the preeminent in stealth technology. The fact is, with all the improvements we have made to the 688 class, we do not have any more room to incorporate further improvements. For any single thing, including a man almost, to be put on board the I–688 class, I have got to take something off—another man, lead ballast, because we have used up the entire space and weight margin of that submarine.

Seawolf will have a larger hull than a SSN–688 although it is about the same length as the 688. *Seawolf's* hull is 40 feet in diameter where the 688's is 33 feet. That provides more room for stealth technology, gives us greater firepower, because we doubled the number of torpedo tubes and have greatly expanded weapon stowage. Each torpedo tube is 30 inches in diameter where the torpedo tubes we have had on earlier submarines have been 21 inches.

The larger torpedo tube gives us the capability to look at advanced torpedoes, and unmanned underwater vehicles for incorporation into our submarines.

Seawolf will have increased tactical speed and has growth potential designed in.

[Slide No. 11.]



SSN 21
AFFORDABILITY

MODELED
AFTER
TRIDENT

OPERATIONAL
AVAILABILITY
INCREASED

NO INCREASE
IN MANPOWER

OPERATING AND SUPPORT COSTS REDUCED

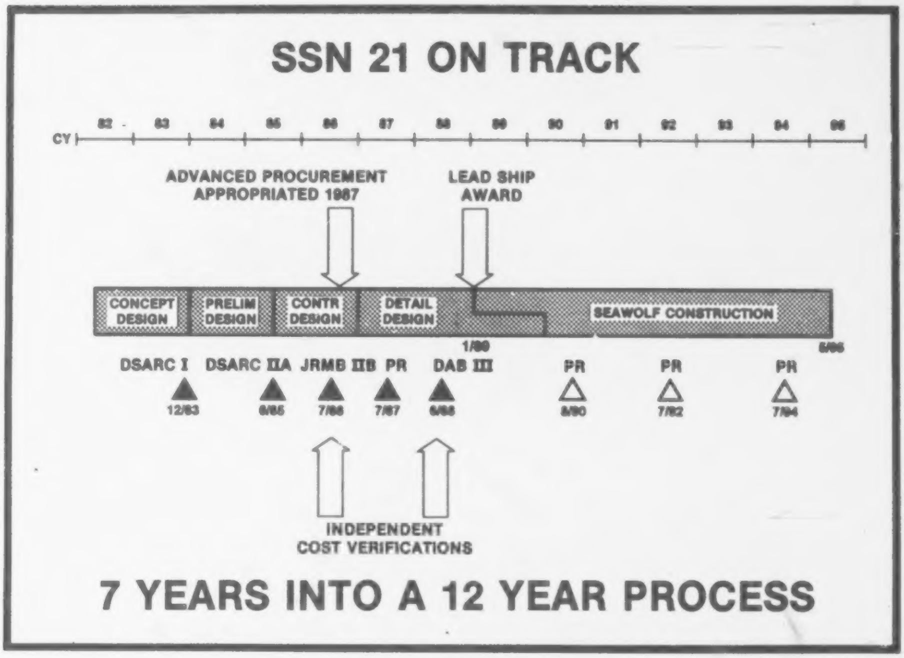
Seawolf was designed for affordability. We have maintained the crew size at the same level as the 688. *Seawolf*'s maintenance philosophy is modeled after Trident. As we looked at Trident, we tried to do everything possible on *Seawolf* to make sure that we kept it maintained at the least cost possible.

One of the major design features of *Seawolf* is that we made it big enough so that you can move large pieces of equipment around within the ship. We also designed in large access hatches, so that when the ship comes in port we can pull the hatch out, you can move the machinery underneath the hole, and pull the whole piece of machinery out.

Using a rotatable pool allows you to repair selected equipment ashore while putting another piece of machinery in its place, and send the ship back out to sea. As a result of a rotatable pool, maintainability improves dramatically.

Over the lifetime of the SSN-21 we expect to have only one overhaul. That is about one-half of what we have on the 688's now. Over the lifetime of the ship, this translates up to 2 years more operating time in comparison with previous submarines we have had.

[Slide No. 12.]



SSN 21 ON TRACK

CY
82
83
84
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95
ADVANCED PROCUREMENT APPROPRIATED 1987
LEAD SHIP AWARD
CONCEPT DESIGN
PRELIM DESIGN
CONTR DESIGN
DETAIL DESIGN
SEAWOLF CONSTRUCTION
1/89
5/95
DSARC I
12/83
DSARC IIA
6/85
JRMB IIB
7/86
PR
7/87
DAB III
6/88
PR
8/90
PR
7/92
PR
7/94
INDEPENDENT COST VERIFICATIONS

7 YEARS INTO A 12 YEAR PROCESS

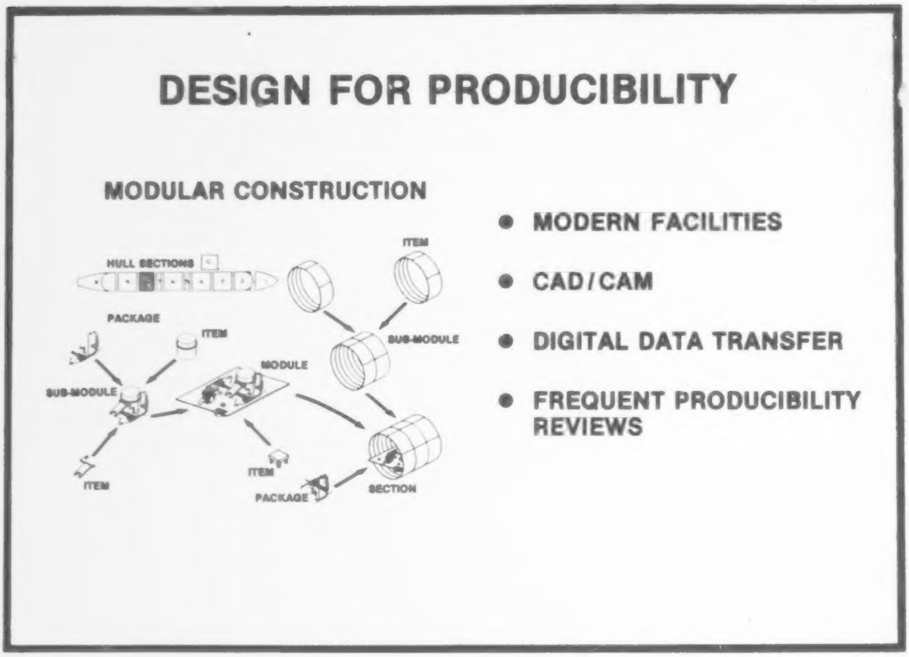
We feel the SSN-21 program is on track. We are now 7 years into a 12-year program. It will be 12 years from the time we first started concept design until delivery of the first ship in about May 1995.

We have just awarded the lead ship contract. The important point is that we have had 2 already plus years of detailed design. In comparison, when we awarded the lead 688 contract, we had only had 3 months of detailed design.

A second point is when we signed the lead ship *Seawolf* contract we let the contract for one submarine. When we let the first contract on the 688's, we let one contract for 12 submarines. This did not help us when we wanted to incorporate improvements or found construction problems we should fix.

Based on independent cost verifications, we feel that *Seawolf* is on schedule and on cost.

[Slide No. 13.]



DESIGN FOR PRODUCIBILITY

MODULAR CONSTRUCTION

- MODERN FACILITIES
- CAD/CAM
- DIGITAL DATA TRANSFER
- FREQUENT PRODUCIBILITY REVIEWS

Seawolf is designed for producibility. Both of the shipyards who will be building the SSN-21 have implemented modular construction. That is, the ship is built in several modules. Each module is then end loaded with systems and equipment that is fully assembled and in most cases fully tested.

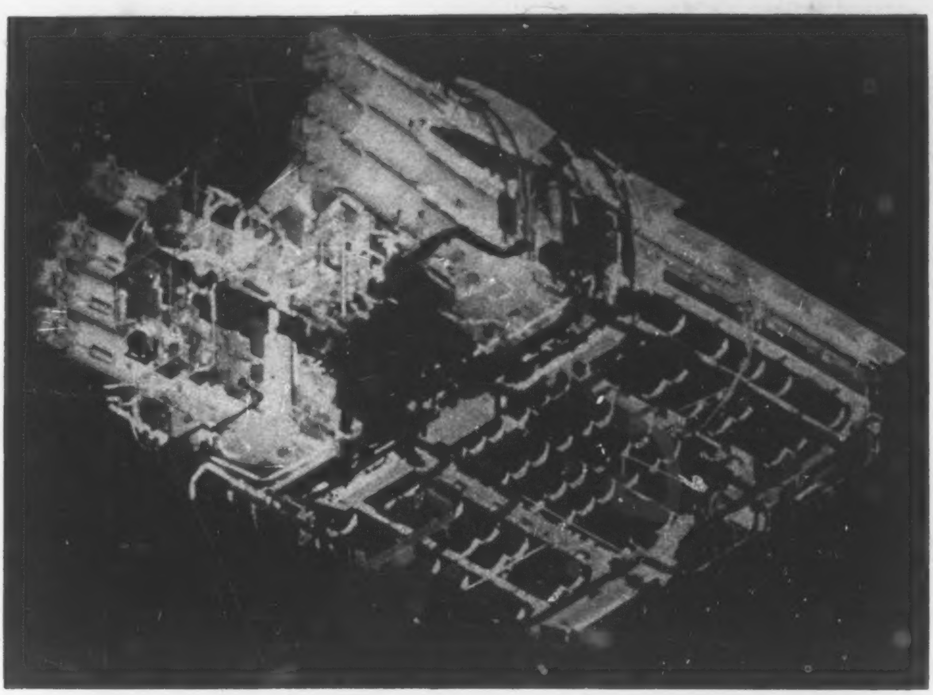
Once outfitted, the modules are assembled together and welded. It is a very efficient way of building modern submarines.

EB, Electric Boat, which has the first contract, has been utilizing modular construction techniques with the Trident and started several years ago on the 688 class. Newport News, the other competitor, has also recently implemented modular construction techniques, and their first ship constructed using this technique, the U.S.S. *Scranton* on April 15, 1989 was christened.

The shipyards also have implemented computer-aided design techniques. Both companies have worked together on the design of this submarine since its inception. As a matter of fact, there is a complete mockup of the after end up at Electric Boat and of the forward end down in Newport News.

Computer-aided design is a very fascinating evolution. The two companies have been working to become leaders in the industry in the implementation of computer-aided ship design. Together they have the ability to transfer digital ship designation back and forth between companies, and of course, there are frequent design reviews conducted to assess the status of design.

[Slide No. 14.]

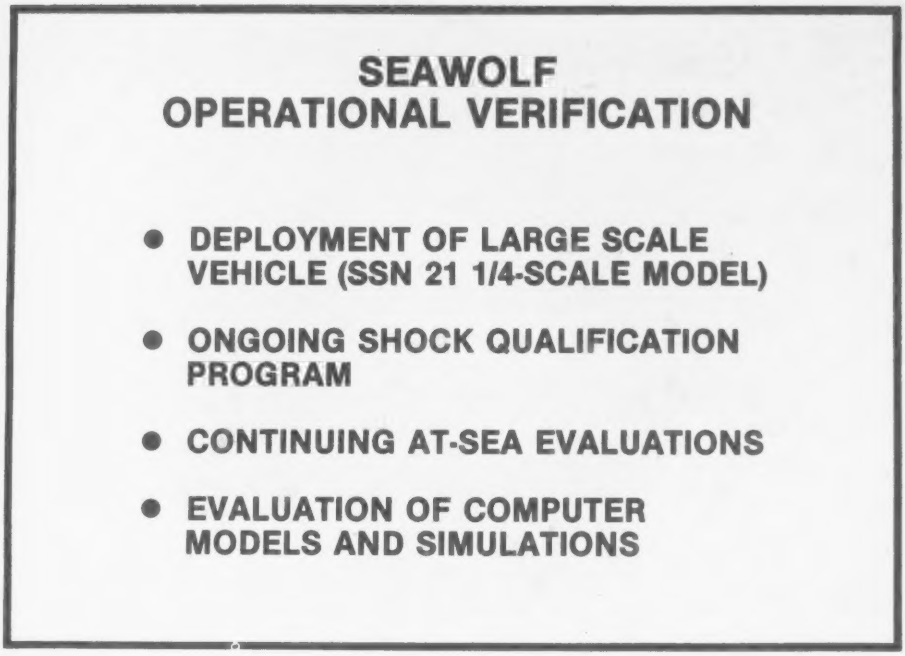


I wanted to show you this slide as an illustration of computer-aided design. You have the ability with computer-aided design to move or replace a particular component on the computer to see how it fits in with the rest of the compartment without having to physically redesign the system.

This slide shows the weapons compartment space. *Seawolf* will have twice as many torpedoes on board as any other submarine in the world.

Also shown are the eight torpedo tubes which I spoke of before.

[Slide No. 15.]

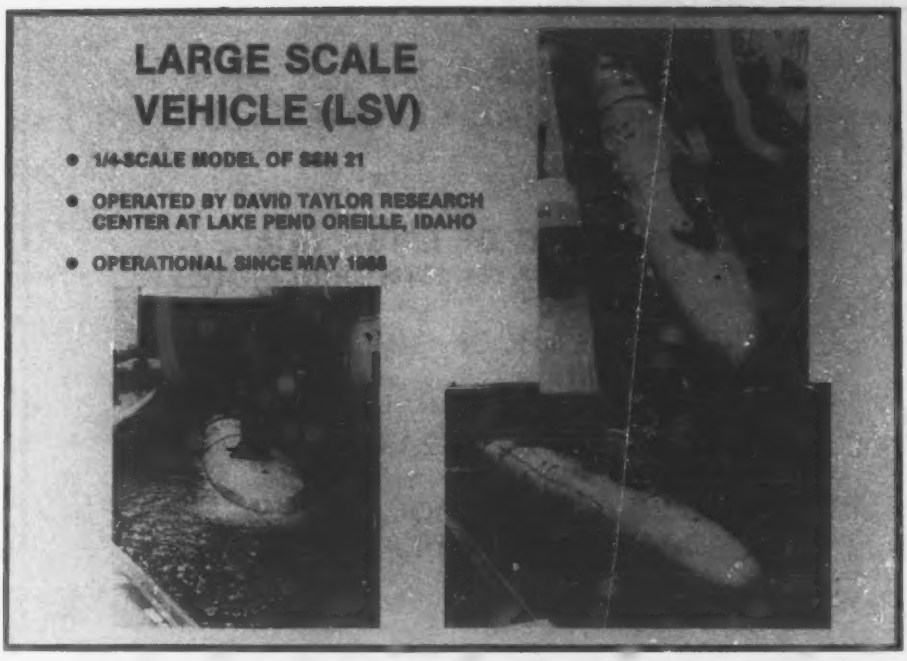


SEAWOLF
OPERATIONAL VERIFICATION

- DEPLOYMENT OF LARGE SCALE VEHICLE (SSN 21 1/4-SCALE MODEL)
- ONGOING SHOCK QUALIFICATION PROGRAM
- CONTINUING AT-SEA EVALUATIONS
- EVALUATION OF COMPUTER MODELS AND SIMULATIONS

We have a significant operational verification program for *Seawolf*. This slide enumerates programs in place to verify the technology that we are putting on *Seawolf*. Extensive validation of *Seawolf* will take place even before it goes to sea. Major aspects of this program are: the utilization of a large-scale vehicle, an ongoing shock qualification program, at-sea evaluations of prototype equipment and performance verification using computer models and simulations.

[Slide No. 16.]

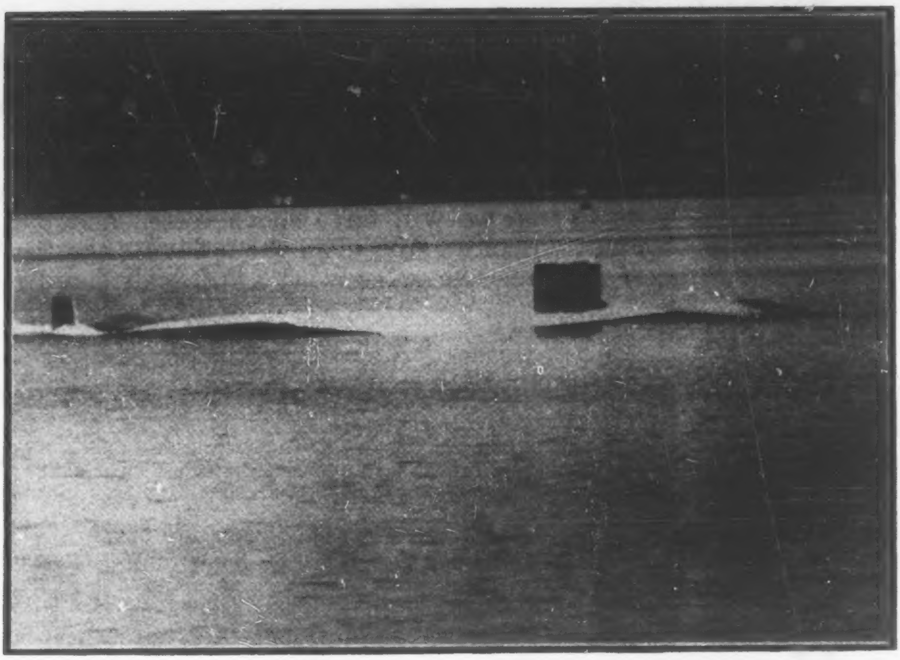


LARGE SCALE VEHICLE (LSV)

- 1/4-SCALE MODEL OF SSN 21
- OPERATED BY DAVID TAYLOR RESEARCH CENTER AT LAKE PEND OREILLE, IDAHO
- OPERATIONAL SINCE MAY 1988

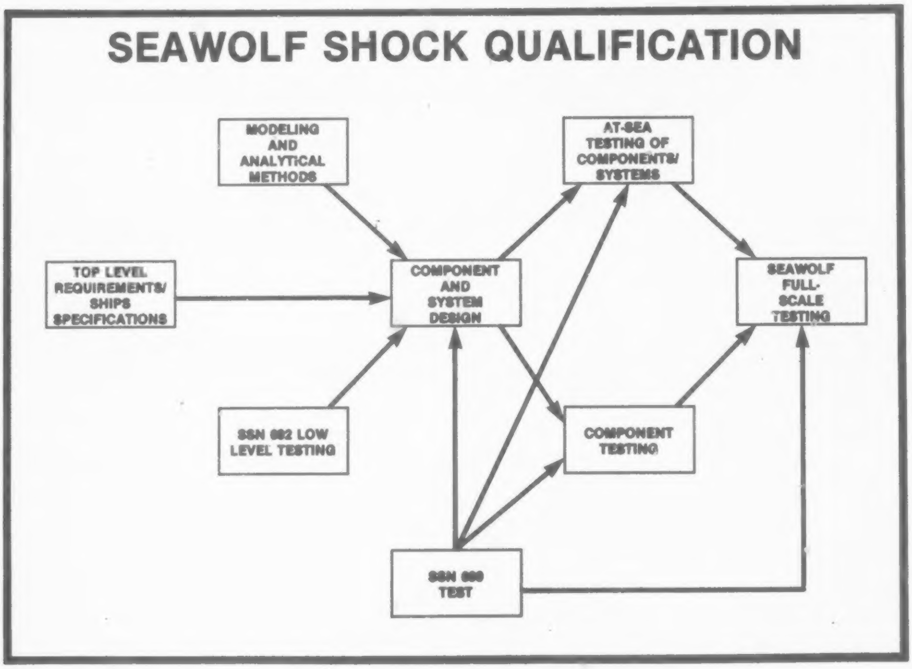
This slide shows the large-scale vehicle. It is a one-quarter scale model of SSN-21 that we have out at Lake Pend Oreilla in Idaho. Because of this platform, we have been able to test several variants designed for SSN-21. The testing we have been able to do in 3 months would have taken several years using previous testing methods.

[Slide No. 17.]



We can also use the LSV to check the hull appendages, the sail design, and to check the whole exterior design of the ship.

[Slide No. 18.]



SEAWOLF SHOCK QUALIFICATION

MODELING AND ANALYTICAL METHODS

AT-SEA TESTING OF COMPONENTS/ SYSTEMS

TOP LEVEL REQUIREMENTS/ SHIPS SPECIFICATIONS

COMPONENT AND SYSTEM DESIGN

SEAWOLF FULL-SCALE TESTING

SSN 692 LOW LEVEL TESTING

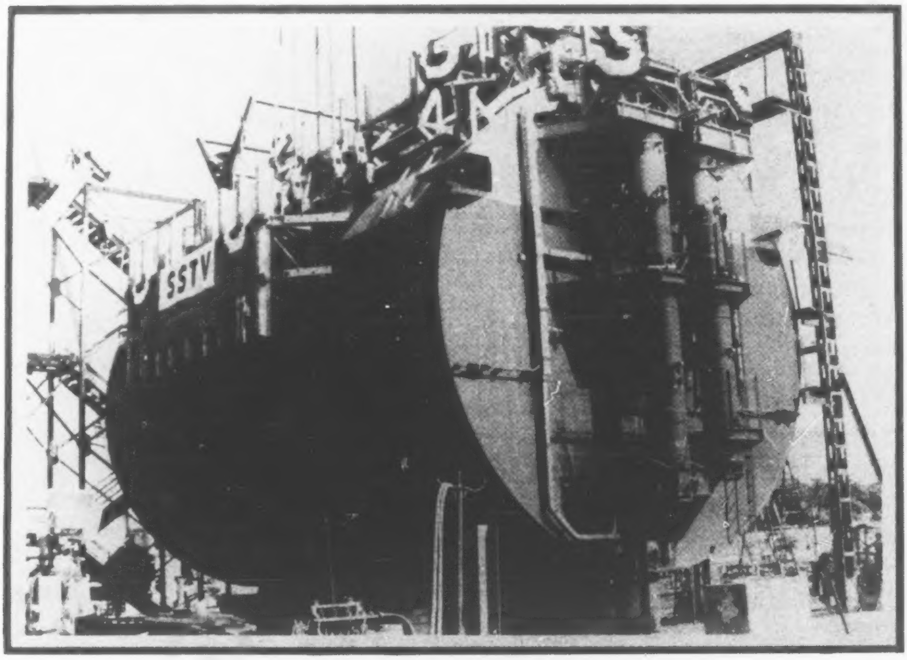
COMPONENT TESTING

SSN 690 TEST

We have an ambitious shock qualification program. Prior to last summer the last ship that went through full shock tests was back in 1963. We have recently completed shock testing of the U.S.S. *Jacksonville* (SSN-699). Every week for 5 weeks, we conducted a live fire test to ensure the survivability of the entire submarine.

Additionally, we also have shock procedures to conduct shock tests of each component that we put on board that ship. So by the time the SSN-21 goes to sea, we will have shock tested about 97 percent of the equipment on board. And even then, during the first year that the *Seawolf* is at sea, we will give it a full-scale live fire shock test.

[Slide No. 19.]



This slide shows the submerged shock test vehicle (SSTV). We rig in whole systems or larger pieces of equipment in the SSTV, submerge it and shock test that equipment individually. Successful completion qualifies the equipment for installation on the ship.

[Slide No. 20.]

This is a picture of the shock test of the U.S.S. *Jacksonville.* As I said, there were five separate tests one week apart. We sent the ship to sea, performed the shock test, brought the ship back in, checked her condition, then we sent her back out for the next shock test. We did that for 5 weeks.

Jacksonville is now in overhaul. We are thoroughly checking the ship for evidence of problems that we previously had not identified.

[Slide No. 21.]

EXTENSIVE OPERATIONAL EVALUATION PROGRAM

- PROGRAM ONGOING SINCE 1984
- LANDBASED TESTING OF ADVANCED TECHNOLOGY EQUIPMENT
  - MAIN PROPULSION UNITS
  - WEAPON LAUNCH DEVELOPMENT
- PROTOTYPES UTILIZED FOR AT-SEA VALIDATION
  - ADVANCED AUXILIARY SYSTEMS
  - HULL COATINGS
  - APPLICATIONS OF SILENCING TECHNOLOGY

SUCCESS RATE OF PROGRAM YIELDS HIGH CONFIDENCE IN MEETING SEAWOLF PROGRAM OBJECTIVES

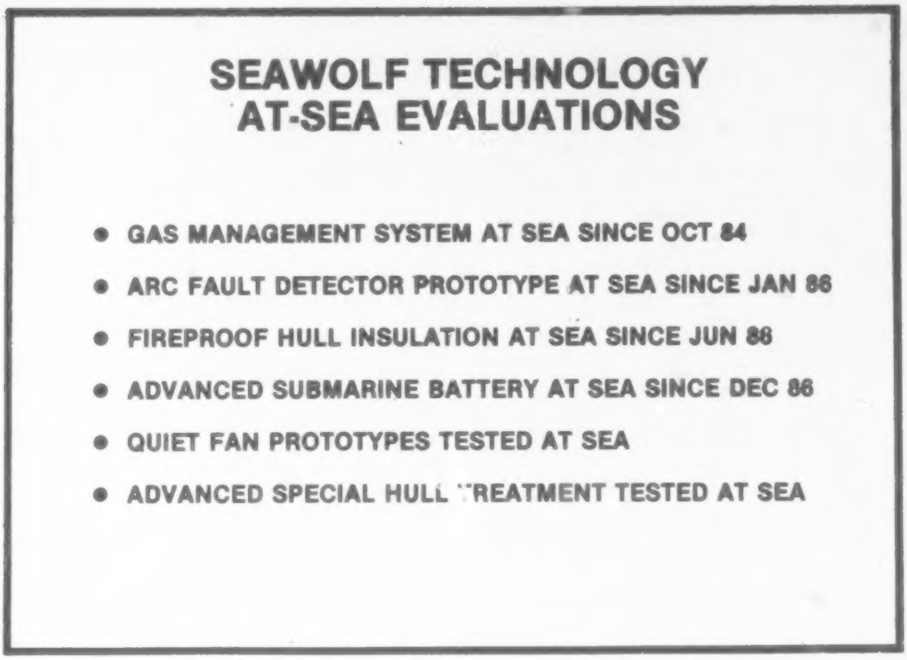
Another key part of the operational evaluation program, is a significant amount of land-based testing that has been ongoing since 1984. One of the major systems we have tested, is an improved propulsion machinery plant at a test site in Philadelphia.

The improved propulsion machinery plant will go on one of the later 688 class submarines and is a smaller version of the same plant technology that will go on the SSN-21. Land based testing has also been used for weapons launch development. We are doing torpedo tube launch development at a company up in Massachusetts.

We are also testing prototypes for at-sea validation of various components and systems, and later, I will show you a list of some of these.

The key point I want to make is that we are testing all the equipment that is going on *Seawolf* either at a land-based test site or at sea on submarines before it gets to the SSN-21.

[Slide No. 22.]

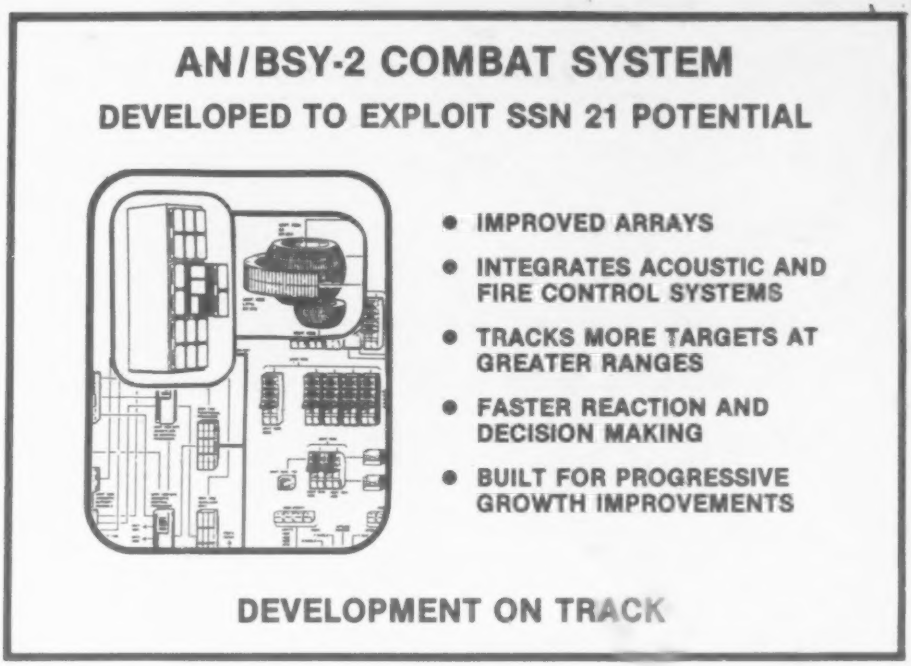


SEAWOLF TECHNOLOGY AT-SEA EVALUATIONS

- GAS MANAGEMENT SYSTEM AT SEA SINCE OCT 84
- ARC FAULT DETECTOR PROTOTYPE AT SEA SINCE JAN 86
- FIREPROOF HULL INSULATION AT SEA SINCE JUN 86
- ADVANCED SUBMARINE BATTERY AT SEA SINCE DEC 86
- QUIET FAN PROTOTYPES TESTED AT SEA
- ADVANCED SPECIAL HULL TREATMENT TESTED AT SEA

This slide shows some of the new technologies undergoing at-sea evaluations. We have had a gas management system at sea since 1984, an arc fault detector which reduces the chance of electrical fires, such as what we think happened on board the *Mike*. Since January 1986 we have been evaluating the performance of an advanced submarine battery. Quiet ventilation fans are extremely important to a submarine and we have been testing new and evolutionary ideas for these fans at sea for some time.

[Slide No. 23.]



AN/BSY-2 COMBAT SYSTEM

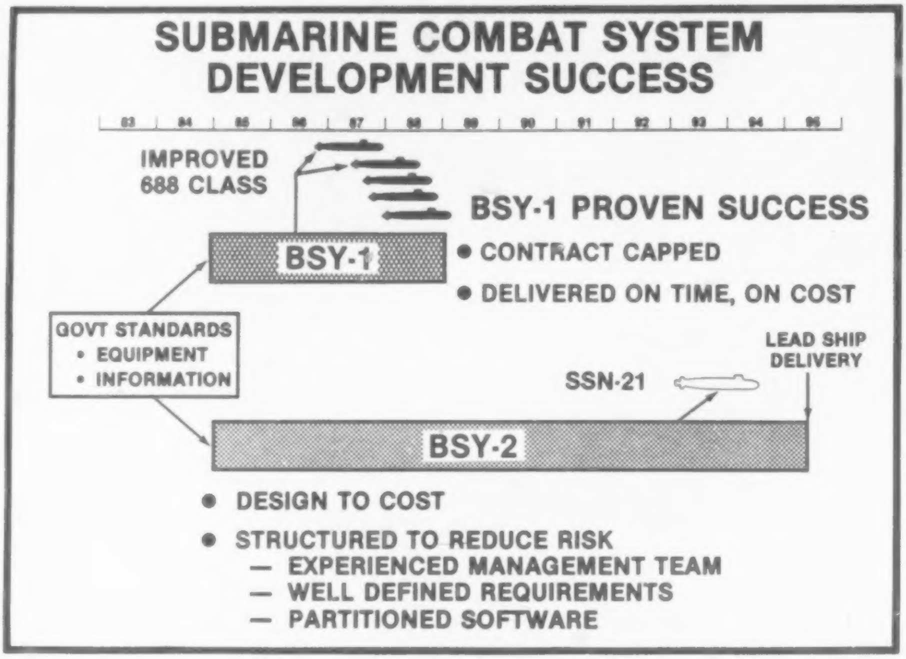
DEVELOPED TO EXPLOIT SSN 21 POTENTIAL

- IMPROVED ARRAYS
- INTEGRATES ACOUSTIC AND FIRE CONTROL SYSTEMS
- TRACKS MORE TARGETS AT GREATER RANGES
- FASTER REACTION AND DECISION MAKING
- BUILT FOR PROGRESSIVE GROWTH IMPROVEMENTS

DEVELOPMENT ON TRACK

The BSY-2 Submarine Combat System, has improved arrays, and some of which are at sea right now. As mentioned previously, this combat system integrates the fire control system and the acoustic capability of the sensors. This particular system will be able to track more targets and will process data at a faster rate than any system we have had on a submarine to date.

[Slide No. 24.]


83
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IMPROVED 688 CLASS
BSY-1
GOVT STANDARDS
• EQUIPMENT
• INFORMATION
SSN-21
LEAD SHIP DELIVERY
BSY-2

SUBMARINE COMBAT SYSTEM DEVELOPMENT SUCCESS

BSY-1 PROVEN SUCCESS

- CONTRACT CAPPED
- DELIVERED ON TIME, ON COST

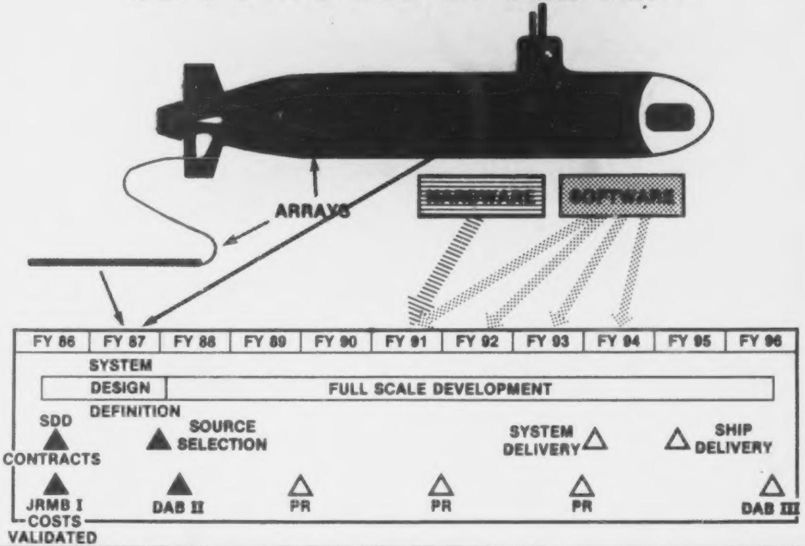
- DESIGN TO COST
- STRUCTURED TO REDUCE RISK
  - EXPERIENCED MANAGEMENT TEAM
  - WELL DEFINED REQUIREMENTS
  - PARTITIONED SOFTWARE

We have confidence in our ability to meet the BSY-2 schedule. One of the reasons is the success of the BSY-1, the combat system installed on the improved 688. The BSY-1 procurement contract was capped. The first five systems were delivered on time and on cost. The BSY-2 is more comprehensive, and it has more sophisticated equipment, however, it has fewer lines of code than we have already put to sea on the BSY-1.

We have structured the BSY-2 programs with risk mitigation in mind. An experienced management team led by Admiral Volgenau implements all defined requirements as laid out by OSD. The program is designed to deliver what we call partitioned software, which means we can accept the software a little bit at a time, test it, and then move on to the next piece of software.

[Slide No. 25.]

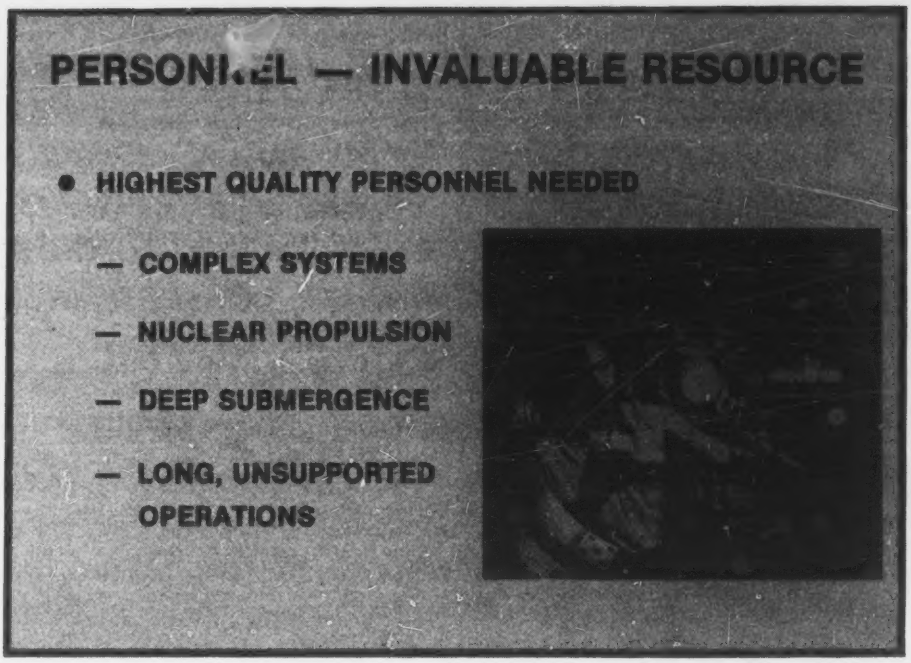
AN/BSY-2 DEVELOPMENT SUPPORTS SSN 21 DELIVERY


ARRAYS
HARDWARE
SOFTWARE
FY 86
FY 87
FY 88
FY 89
FY 90
FY 91
FY 92
FY 93
FY 94
FY 95
FY 96
SYSTEM DESIGN DEFINITION
FULL SCALE DEVELOPMENT
SDD CONTRACTS
SOURCE SELECTION
SYSTEM DELIVERY
SHIP DELIVERY
JRMB I COSTS VALIDATED
DAB II
PR
PR
PR
DAB III

I want to highlight several areas on the development schedule, because with the BSY-2 there are two items that are already at sea being tested right now. One is an advanced towed array which is in the Mediterranean today, the second thing is the wide aperture array which has been at sea on a 688.

The hardware of the BSY-2 combat system will be delivered to the Navy in 1991, and the software will be delivered in several phases, the first one in 1991, the last one in 1994 and as I said, *Seawolf* will be delivered in 1995.

[Slide No. 26.]

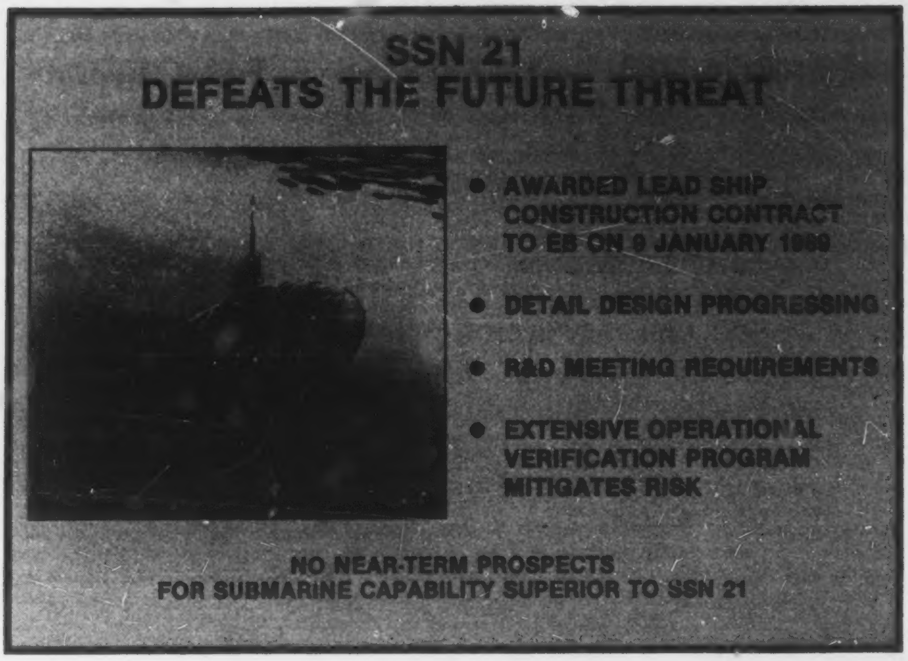


PERSONNEL — INVALUABLE RESOURCE

- HIGHEST QUALITY PERSONNEL NEEDED
  - COMPLEX SYSTEMS
  - NUCLEAR PROPULSION
  - DEEP SUBMERGENCE
  - LONG, UNSUPPORTED OPERATIONS

Without question the most valuable resource that the submarine force has is the personnel. For anybody who has ever been on a submarine I feel that you will agree that the personnel onboard are extremely good, extremely competent, and very impressive.

[Slide No. 27.]



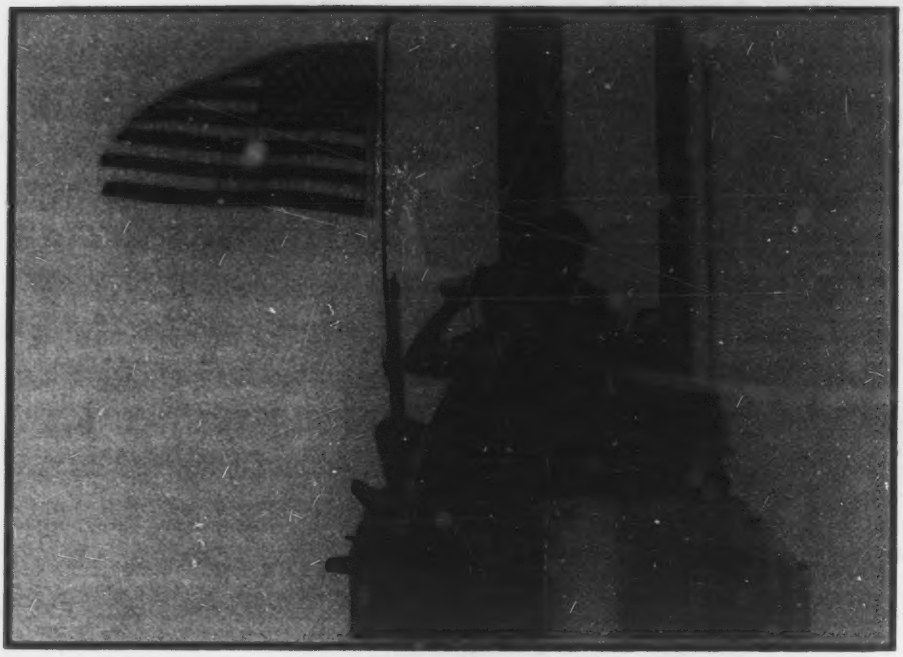
SSN 21
DEFEATS THE FUTURE THREAT

- AWARDED LEAD SHIP CONSTRUCTION CONTRACT TO EB ON 9 JANUARY 1989
- DETAIL DESIGN PROGRESSING
- R&D MEETING REQUIREMENTS
- EXTENSIVE OPERATIONAL VERIFICATION PROGRAM MITIGATES RISK

NO NEAR-TERM PROSPECTS
FOR SUBMARINE CAPABILITY SUPERIOR TO SSN 21

In summary, we think *Seawolf* will ensure U.S. undersea superiority well into the future of the SSN–21. We awarded the lead ship contract to Electric Boat on January 9. The detailed design is progressing and on schedule. The R&D program is meeting requirements, and we have an extensive operational verification program.

[Slide No. 28.]



I would like to point out two more things on people. One is a direct comparison of the submarine crewmen. This is a U.S. submarine with the CO, OOD and the lookout on the bridge. Everybody is smiling and the flag is waving. My only problem is the CO is looking in one direction, the others are looking in the other direction.
[Slide No. 29.]

But this is brand X. This is a Victor III submarine that was taken by a foreign friend of mine. As you see, there is some reluctance to having this picture taken.

That is all I have. Thank you, Mr. Chairman.

[The prepared statement of Admiral Cooper follows:]

STATEMENT OF
VICE ADMIRAL D. L. COOPER, U.S. NAVY
ASSISTANT CHIEF OF NAVAL OPERATIONS
(UNDERSEA WARFARE)

Mr. Chairman and distinguished members of the Committee, I am privileged to report to you on the status of the Submarine Force. During today's review, I will highlight the following significant aspects of our Submarine Force:

- The strategic submarine force is the survivable keystone of this nation's strategic defense deterrent and will remain so for the foreseeable future.
- The nuclear attack submarine force is the linchpin in the successful execution of the maritime component of our national security strategy.
- The Navy has established a well-coordinated program to address the threat both present and future. We are modernizing our submarines with emphasis on warfighting capabilities.
- The Navy is conducting an aggressive and well-balanced Advanced Submarine Technology Research and Development program to preserve our undersea superiority.
- And finally, the importance of our submarine personnel whose dedication and expertise provide us with the cutting edge in any potential conflict cannot be overemphasized.

NATIONAL OBJECTIVES AND UNDERSEA SUPERIORITY

The submarine has come a long way since 1895 when John Holland was awarded his first contract to build a submarine for the United States Navy. It is significant to note that the early submarines were sometimes considered awkward fleet additions at best. Two views which probably best summarize how submarines were considered in naval strategy came from leaders of the

British Navy just after the turn of the century. Over eighty years ago, the First Sea Lord of the Royal Navy, Sir John Fisher wrote, "It is astounding to me, perfectly astounding, how the very best amongst us fail to realize the vast impending revolution in Naval warfare and Naval strategy that the submarine will accomplish." At approximately the same time the Earl of Saint Vincent said of an early submarine enthusiast, He ... "was the greatest fool that ever existed to encourage a mode of warfare which those who command the sea did not want and which, if successful, would deprive them of it."

In a way history has proven both of these prominent naval proponents correct; today's nuclear submarines continue to expand their role in the maritime component of our national security strategy; our Nation's maritime supremacy is absolutely dependent upon the maintenance of undersea superiority.

The key elements in the execution of our maritime strategy in war are to take the fight to the enemy by confining and destroying the threat far forward, to coalesce our valued allies by providing a viable warfighting capability in their theater, and to provide an invulnerable nuclear deterrent to preclude nuclear escalation. The means of executing our maritime strategy have been constantly changing due to evolving technologies, shifting balances of power and changing alliances and relationships. As these conditions have clarified, the submarine force has assumed a consistently larger role and is now the dominant contributor to both strategic and tactical deterrence. Today's strategic missile submarines including our modern TRIDENT submarines, are the quietest most survivable submarines in the world today, and represent the preeminent leg of the strategic deterrent TRIAD. The attack submarine force led by the LOS ANGELES 688 Class maintains an unchallenged, worldwide presence. Our 688 Class SSNs are capable of delivering sudden and overwhelming firepower against both land and sea-based targets using MK48 and MK48 Advanced Capability (ADCAP) torpedoes as well as HARPOON and TOMAHAWK missiles. The Integrated Undersea Surveillance System (IUSS) is another key element of our maritime strategy, providing critically important strategic and tactical cuing information in support of ASW operations.

We maintain our undersea superiority by recognizing the inherent characteristics of nuclear submarines -- stealth, mobility, endurance and firepower -- and we plan to enhance those attributes with the proper balance of design improvements and operating procedures.

Stealth - The submarine is the first true stealth platform. U.S. submarine survivability is based on stealth to avoid detection coupled with designed-in reliability and maintainability of the ship and its systems to reduce any dependence on external support.

Mobility - Mobility allows us to rapidly deploy submarines to any ocean of the world in a crisis and, when no longer needed, to quietly withdraw. The submarine force creates leverage out of proportion to its size because an adversary does not know whether or in what number submarines are present. In the Falkland crisis, the threat of British nuclear submarines kept the Argentine Navy in port. This is an excellent example of the leverage of nuclear submarines.

Endurance - A nuclear submarine can operate unsupported in hostile waters for months. This staying power is of inestimable value to the operational commander, especially in protracted crises and in view of our decreased ability to rely on forward foreign bases.

Firepower - Our strategic submarines carry ballistic missiles capable of striking targets anywhere in the world with an accuracy heretofore thought achievable only by land based missiles. Attack submarines carry a variety of torpedoes and cruise missiles. With these weapons U.S. submarines can not only successfully engage all targets at sea but also project their striking power ashore. Moreover, few defensive weapons and no escorts are required; the ratio of offense to defense is very high.

Our Submarine programs have built upon these basic characteristics in a most cost-effective manner. Today's submarine is one of the country's most efficient and cost-effective platforms -- THE ENTIRE SUBMARINE FORCE COSTS LESS THAN SIX PERCENT OF THE DEPARTMENT OF DEFENSE BUDGET. The attack submarine force with ninety-eight SSNs represents over thirty-five percent of the Navy's combatant ships but uses less than ten percent of the Navy's budget. Submarine crew size, traditionally small, has remained relatively constant while the ships have become larger and significantly more capable. Additional cost-effectiveness efforts include increasing operating time at sea by extending the periods between overhauls and increasing system commonality between strategic and attack submarines. In addition, we have designed improved reliability and maintainability into our submarine components and machinery.

MEETING THE THREAT

The significance of Admiral Sir John Fisher's words on the revolutionary impact of the submarine on naval strategy and the prophecy of the Earl of St. Vincent that maritime supremacy would rest on a submarine force which had achieved undersea superiority has not been lost on the Soviet Union. Traditionally a strong land power, over the past twenty years the Soviet Union has developed a blue-water Navy which far surpasses all reasonable defensive requirements. Its very existence can only be seen as a challenge to our maritime supremacy.

In building this fleet the Soviets believe, in the words of Rear Admiral Nikolarz V'yunenko, "... all of the principal indicators that characterize any modern navy are concentrated in the nuclear powered submarine's great striking power, high mobility and concealment, the capacity to conduct combat actions on a global scale -- destroying enemy ground targets, submarine and surface combatants." It is therefore no surprise that THE PRINCIPAL SHIP OF TODAY'S SOVIET NAVY IS THE SUBMARINE.

The total number of submarines produced by the Soviets each year has decreased due to the increased complexity and quality of the modern submarines which they are building. However, we see no reduction in their commitment to their submarine force. Sixty percent of current Soviet naval construction capacity is dedicated to submarines. They are building quieter nuclear submarines with improved sensors, weapons, and electronic systems. Despite the decrease in their rate of submarine construction, the Soviet Union is still exceeding the production rate of the United States by fifty to one hundred percent.

Soviet submarine programs enjoy consistent, high priority funding in sufficient quantity to allow aggressive research and more than a few development and construction programs. The latest Soviet submarines are large, multi-mission and highly capable. The obvious results of their submarine technology R&D programs are impressive. Some of their very expensive submarines go deeper and one can move faster than ours, but the Soviets have yet to achieve a balanced design capable of exploiting the full range of potential submarine capabilities. The latest Soviet submarines are highly capable, but not qualitatively superior to ours.

U.S. undersea superiority is of grave concern to the Soviets. They recognize our ability to operate anywhere in the world and have devoted enormous resources over the past several decades in an attempt to attain submarine superiority. However, the laws of physics are universal and irrefutable; there is no indication the Soviets have made or are on the verge of making any major technological breakthroughs. Their consistent dedication to submarine warfare has narrowed the gap between the U.S. and Soviet submarine but a gap is still present. We fully expect them to continue to improve in the future. We too have improved and are prepared to meet the challenge.

Today's U.S. submarine force is unquestionably the best in the world. We have the best people, ships, weapons, sensors and support facilities. This fact is not the fulfillment of any historical prerogative but instead the product of a well conceived and executed submarine program which has enjoyed your consistent support. We build the best submarines, receive the best people and operate and train in the toughest environment possible.

We are not resting on our laurels in the submarine force. The programs presented in the FY90 budget request are based upon a careful analysis of the threat and the imperative to counter it within available resources. The programs we propose are directed at the goals of sustaining high force readiness, maintaining the force modernization program to continue our undersea superiority, and testing thoroughly the operating procedures which will retain our relative position in this very challenging atmosphere. With the D-5 missile and TRIDENT submarines, Improved SSN-688 Class submarines, the new SSN-21, SEAWOLF Class construction and the establishment of a far-reaching research and development program we are well positioned to attain those goals.

Approximately fifty-five percent of submarine force funding goes toward maintaining readiness. These funds involve key expenditures for personnel, maintenance facilities, training, shipyard overhaul, repair parts and the host of other support and logistic items necessary to maintain a highly capable force.

In the face of the improving Soviet threat and their continued numerical advantage, we have established a balanced modernization program. The continued upgrading of our current submarines with improved combat and sensor systems, the initiation of the D-5 missile installation on our TRIDENT submarines and the start of construction of the SSN-21, our first new attack submarine in twenty years, are major modernization initiatives absolutely necessary to address the future threat.

Realizing that he who stands fast in today's technologically progressive world is soon surpassed, and responding to Congressional initiatives, we have established an organization in the Naval Sea Systems Command to specifically coordinate and manage submarine research and development. This organization has put in place a continuing, aggressive and balanced advanced submarine technology and R&D program to preserve our undersea superiority and to form the Navy's conduit from the Advanced Submarine Technology Program at the Defense Advanced Research Projects Agency (DARPA).

STRATEGIC SUBMARINE FORCE

On a day-to-day basis, our strategic submarines, with their submarine launched ballistic missiles (SLBM), provide the most cost effective and single greatest deterrent to nuclear war. These submarines carry almost fifty percent of the strategic warheads in our country's inventory for only about twenty-five percent of the Department of Defense strategic budget. These costs represent about ten percent of the Navy's total budget and support all aspects of the strategic submarine program including operation, maintenance, training, support, procurement, and modernization. This cost-effectiveness results from the small crew size, the high ship operating tempo, and the proven reliability of the submarine and missile systems.

The goal of the U.S. strategic deterrent forces (the TRIAD) is to deter the Soviet Union from committing aggression. This is best assured by having strategic forces which are reliable, responsive, and have sustained survivability. The SLBM is the one strategic system possessing all these elements and therefore it serves as the keystone to our national strategic posture.

The Navy is assuming the role as strategic leader primarily by virtue of the introduction of the TRIDENT II (D-5) missile. Its improved accuracy, greater range and larger payload ensure that the SLBM leg of the TRIAD has the capability to engage the full spectrum of targets. These attributes combined with the invulnerability of the SSBN force result in viable strategic stability.

The strategic submarine force is controlled through a reliable, redundant, continuous and reconstitutable communication system. A complete end-to-end evaluation of the entire SSBN strategic communications system has been conducted and has proven our ability to maintain continuous communications with the National Command Authority. Submarine strategic communications systems continue to be improved in compliance with National Security Decision Directive. The E-6A aircraft, carrying a mobile and highly survivable VLF transmitter, is in the process of replacing the EC-130 TACAMO aircraft. Other improvements including a redundant Extremely Low Frequency (ELF) transmitter, MILSTAR satellite system communications suite upgrades to TACAMO aircraft, and other reconstitutable systems are planned to replace aging systems and provide continued survivable communication links to our strategic submarines in the future. Your support for this continuing upgrade program will promote stability in a crisis by assuring that National Command Authority orders can be delivered before, during or after a nuclear attack on the United States.

The TRIDENT submarine's overall capability and firepower is unmatched. Of the sixteen OHIO Class TRIDENT submarines authorized, eight are making routine patrols from the Bangor, Washington, submarine base. They have completed over one hundred deterrent patrols. The entire SSBN Force has completed more than two thousand six hundred strategic deterrent patrols since the first POLARIS SSBN departed Charleston, South Carolina, in November 1960, a tremendous success story for deterrence.

The TENNESSEE (SSBN 734) is the first TRIDENT II (D-5) missile capable ship. TENNESSEE was delivered six weeks early and is currently supporting TRIDENT II (D-5) missile testing from the Kings Bay, Georgia, submarine base. Seven TRIDENT submarines are presently under construction. We continue to support the President's strategic modernization plan by building one TRIDENT SSBN each year; the seventeenth ship is requested in the FY90 budget with advanced procurement for the nineteenth. This most important and highly successful program deserves your strong continued support.

We ensure the survivability of the strategic submarine with the SSBN Security Program. This program, based on detailed and systematic scientific measurement continuously evaluates emerging threat technologies to prevent vulnerability from technological surprise. Key elements of the program are all source idea solicitation, leading edge technology research and exhaustive on-site testing. All source idea solicitation includes foreign exchange programs and intelligence agency inputs and assessments. Broad agency announcements keep channels open for academia and industry alike to approach us with innovative ideas or technologies requiring investigation. The most knowledgeable people the Navy can find conduct thorough and systematic research to resolve technical uncertainty and, where necessary, develop countermeasures to outpace potential technological threats.

Finally, this program includes evaluations at sea using operating submarines. Detectability is assessed and research results verified in over one hundred forty exercises each year. An additional benefit of these exercises is the development of tactics to ensure future survivability of our first-line strategic deterrent. It is the combination of technical advances as well as operational and tactical procedures, all under constant review, which have and will continue to guarantee the survivability of our sea based leg of the TRIAD.

Program results are critically reviewed by scientists from academia and industry, as well as senior level peer groups. Among the groups who periodically evaluate program management and results are the Advanced Technology Panel to the CNO's Executive Board, the Defense Science Board, the JASONs who provide an independent evaluation by scientists in academia, and the CIA which has been directed by Congress to independently assess the threat from non-acoustic detection technology developments.

Independent conclusions have consistently agreed: There is no scientifically plausible prospect for an ASW technology breakthrough which would provide a basis for a threatening attack through the 1990's and probably well beyond. The modest cost expended on SSBN security in relation to the value of the strategic submarine force warrants full support in this all important area.

The TRIDENT II (D-5) missile successfully completed sixteen of eighteen test flights and continues to meet design goals. The program is within cost and is on track with the initial schedule established in 1981 subsequently accelerated by three years to achieve a December 1989 Initial Operating Capability (IOC). The recent House Armed Services Committee (HASC) and the General Accounting Office (GAO) reports confirm these facts and praise the Navy's management of this program. The FY90 budget requests funding for sixty-three TRIDENT II (D-5) missiles. These quantities are required to support TRIDENT submarine loadouts and the vital Operational Test/Follow-on Operational Test (OT/FOT) program which ensures continued system reliability and accuracy. Our confidence in the ability of this superior weapon system to perform its mission depends on the implementation of the recommended procurement profile.

The strategic submarine force will unquestionably remain the keystone of our strategic deterrent force by virtue of its survivability, controllability, and capability. Its importance to our national security warrants the full support of Congress even in a climate of declining budgets. The essential elements of the FY90 program are the continued production of TRIDENT II (D-5) missiles and the construction of one TRIDENT submarine. These programs represent the most cost-effective and enduring strategic deterrent which we can provide to the citizens of our country.

ATTACK SUBMARINE FORCE

The success of our military strategy is directly dependent on the ability of our attack submarines to carry out their mission far-forward deep in enemy waters. Our current attack submarine force is capable of fighting and winning against the threat both today and in the near-term. This fact is substantiated as a matter of record by our day-to-day operations. Today, we have a clear qualitative edge over the Soviets; however, it is absolutely imperative that we follow a cost-effective modernization plan which addresses the improvements required to maintain our undersea superiority against the projected threat. In response to this challenge, the current budget supports a detailed program for the modernization of our submarine force. The elements of this program are:

- SSN-21 SEAWOLF Class Construction Program
- Ongoing SSN-688 Improvement Program
- Submarine Weapon and Acoustic Sensors Upgrades
- Integrated Undersea Surveillance System (IUSS) Modernization

- A Research and Development Program which is Innovative and Executable

SSN-21 SEAWOLF CLASS CONSTRUCTION PROGRAM

In 1900 while Electric Boat Company was being awarded its first contract to produce a submarine for the U.S. Navy, another inventor was in the process of selling the Russians a different design for four submarines. There was a basic capability difference between the two submarine types; the submarines proposed for the Russians had huge wheels -- to maneuver on the bottom of the seabed -- and a large spotlight to provide illumination through a window. The U.S. Navy had rejected this design because, although it was admittedly ingenious, the U.S. Government needed an underwater warship. The point of this anecdote is that the Russians, even then, not only had the money but also the desire to invest in unique specialized submarine designs; while the United States was looking for a basic submarine design which would be effective at undersea warfare.

Today, in 1989, as we commence the construction of the next generation of fast attack submarines, with the award of the first SSN-21, SEAWOLF, to that same Electric Boat Company, the lessons of that anecdote are still applicable. Using American ingenuity, the SSN-21 design has been optimized to take advantage of all currently feasible submarine warfare technological advances. The Russians have some very expensive submarines which individually may go deeper or faster but when the mission aspects of design and performance and their relationship to technical realities are thoroughly considered the SSN-21 is a much more capable submarine. It will ensure our undersea superiority through the early part of the 21st century. The SSN-21 represents a revolutionary improvement in submarine warfighting capability. When SEAWOLF joins the fleet in 1995, she will take to sea:

- Innovative quieting improvements which will make her the quietest submarine in the world at any speed,

THE ULTIMATE IN 20TH CENTURY STEALTH TECHNOLOGY

- Higher tactical speed for greater search effectiveness and lower probability of counterdetection
- Greater operational speed and depth capability for increased mobility and, if necessary, evasion
- Advanced sensors for extended detection and attack ranges
- Greater firepower for increased endurance and capability against a broader range of targets
- Sufficient design margin for growth to incorporate future technological advances through her life

Repeated, objective and independent analyses have concluded that SEAWOLF and her sister ships will have three times the mission effectiveness of the Improved SSN-688. The SEAWOLF will restore the commanding technological and tactical margin which historically we have enjoyed over the Soviets and will maintain this advantage in the far-term. Thorough analytical studies and at-sea operations have verified that there are no near-term prospects for submarine capability superior to SSN-21.

The construction procedure for the SSN-21 has capitalized on the highly successful modular construction techniques used for the TRIDENT submarine. The SSN-21 will have a fifty percent increase in the modular construction techniques used on TRIDENT. We expect the computer-assisted design techniques and the modular construction procedures to reduce ship construction costs after the two competing shipyards complete their first SSN-21s.

Two major objectives of the SEAWOLF program are to produce a submarine on the leading edge of technology:

1. Which is available for more operating time during its life cycle than current submarines and,

2. Costs less on an annual basis to operate and support than the 688 Class. These goals will be met by reducing the time, over the lifetime of the ship, that the submarine will be in a shipyard for repair and modernization. By reducing depot-level maintenance requirements and lengthy shipyard periods, the operating and support (O&S) costs regularly incurred by the current SSN overhauls will be reduced.

Significant benefits will accrue from achieving these objectives. With respect to a SSN-688 Class submarine on a seven-year overhaul cycle, a single SEAWOLF on a fifteen-year overhaul cycle will realize two years of additional operational time over a thirty-year life.

Increased operating time and reduced operating and support cost will be achieved through innovative design and integrated logistics support planning. These efficiencies have been proven by the successful TRIDENT (SSBN-726) ship design and integrated logistics support program. Design innovations include logistic access hatches which are twice the size of current submarine hatches; interior logistic flow paths which allow easier access to installed equipment; and embedded sensors which automatically and continuously monitor the material condition and operational trends of installed systems and machinery. These improvements have been exceedingly successful in the TRIDENT SSBN program and will reduce the need for hull cuts and drydock time historically necessary to repair and replace major equipment.

Integrated logistic support improvements include increased analysis to provide designed-in maintenance capability and advanced maintenance planning. A rotatable pool of machinery ashore to facilitate rapid replacement of onboard machinery requiring maintenance is a primary component of this system.

The success now being achieved in the TRIDENT program to reduce the operating and support costs is an excellent indication that the SEAWOLF program will also be successful in achieving significant operating cost reductions and adding several years of additional operating time.

Several important milestones were reached recently in the ongoing SEAWOLF research and development program. These include the successful completion of the USS JACKSONVILLE (SSN-699) shock trials and the initiation of model testing using the Large Scale Vehicle (LSV), which is a quarter-scale battery operated model of the SSN-21.

In September 1988, the USS JACKSONVILLE (SSN-699) completed the first full-scale submarine high-intensity shock trials (live fire test) since the last submarine shock trials completed in the early 1960s. Five test shots were conducted with various shock factors up to one half the design value. All five shots were completed with only minor damage and no major degradation of warfighting capabilities. Although data analysis is not yet completed, the initial assessment is that the SSN-688 Class is better designed than any previous class for resistance to shock. The test provided an order of magnitude more data than previous ship shock tests as a result of the use of state-of-the-art instrumentation and data recording equipment. This data will be used extensively in the SSN-21 program to validate and refine SEAWOLF shock design criteria and specifications and also to serve as a model for the live fire test required after SEAWOLF's delivery.

The Navy has developed a quarter-scale model of the SSN-21, called the Large Scale Vehicle (LSV), to serve as an evaluation platform in the design of the propeller unit for SSN-21 and follow-on hulls. The LSV is allowing submarine designers to escape the constraints of tank modelling and to utilize the more accurate, efficient open water environment. It contains totally integrated computer controlled data sensors which are providing invaluable information on SEAWOLF performance with measurements of power efficiency, and acoustic performance. Because the LSV can be reconfigured by modifying the sail and stern structure it will have a major role in future advanced submarine design development as well as in the immediate case of SSN-21. The LSV operating in Lake Pend Orielle, Idaho, provides a breakthrough capability for the development of submarine high speed silencing technology. In the first three months of testing we have made progress that would have required ten years of work using our old methods.

With the support of the American submarine building and design industries at Newport News Shipbuilding and Electric Boat Division and the capabilities of the literally hundreds of related industries across the United States, the SEAWOLF will guarantee America's undersea superiority into the 21st century. I urge your continued strong support of the SEAWOLF program FY90 request for advance procurement for FY91 and FY92 follow-on ships.

ONGOING SSN-688 IMPROVEMENT PROGRAM

In 1982, the Navy with strong Congressional support, commenced a development program to improve the performance of SSN 688 Class submarines. The result was a series of over two thousand minor improvements and more than twenty-five major improvements which constitute the ongoing 688 Improvement (688I) Program. These improvements were incorporated as soon as possible making 688s quieter, faster with better sensors and firepower. These improvements led to the first of the "Improved SSN-688s" which was commissioned in June of 1988. That first 688I, USS SAN JUAN (SSN-751), is fully Arctic capable and has the new AN/BSY-1 combat system. The BSY-1 provides significant improvements in acoustics and weapons capabilities over any submarine combat system at sea today -- advances such as improved active sonar, improved under-ice and mine detection capabilities, lower self-noise and improved commonality and maintenance. SAN JUAN was joined in February by USS PASADENA

(SSN-752). These two Improved SSN-688s with their vertical launch capability, Arctic enhancements, and BSY-1 combat systems are the finest attack submarines in the world today and are the basis for our confidence in continued submarine superiority in the mid-term. There are twenty similarly configured Improved SSN-688s currently in new construction.

The two FY90 SSN-688s will include another significant upgrade to the SSN-688 warfighting capability: the improved performance machinery plant (IPMP). The IPMP will further reduce the radiated noise of these ships.

With the modernization improvements to the sonar systems, combat systems, Arctic capability, and the addition to the original 688 configuration of the vertical launch TOMAHAWK tubes, and the improved performance machinery plant, we have exhausted the potential for further significant improvement to the SSN-688 design. There just is no extra room on the submarine to physically install any additional major new equipment; more importantly there is no weight margin for major improvements in the future. With the two Improved 688 Class submarines requested in the FY90 budget, we recommend the end to the singularly successful SSN-688 Class building program.

SUBMARINE WEAPON AND ACOUSTIC SENSORS UPGRADES

In 1912, then Lieutenant Chester Nimitz' forecast that "The steady development of the torpedo together with the gradual improvement in the size, motive power and speed of submarine crafts in the near future will result in a most dangerous offensive weapon, and one which will have a large part in deciding fleet actions."

We have gone far beyond Admiral Nimitz' call for the steady development of the torpedo. During the last several years, with the advent of TOMAHAWK and the MK48 Advanced Capability (ADCAP) torpedo, submarine weapons have undergone a revolutionary change in capability. Our submarines are equipped with the most effective and lethal arsenal of weapons available to any submarine force in the world. The diverse loadout available to all attack submarines guarantees exceptional operational flexibility and reliability in engaging the full spectrum of threats, in a variety of roles and missions -- ASW, ASUW and strike.

For antisubmarine warfare, the submarine is equipped with one of the most effective torpedoes in the world -- the MK48. In order to provide additional capabilities to this already superior weapon, the MK48 ADCAP torpedo was developed to counter Soviet advances and to improve performance in all possible operating environments. During 1988, we completed the highly successful operational evaluation of the ADCAP torpedo, and loaded operational warshots onto fleet units. We are also conducting a block upgrade program for ADCAP to provide further torpedo improvements.

To complement the ADCAP torpedo in the antisubmarine warfare role, the SEA LANCE ASW standoff weapon is being developed. Based upon computer engagement simulation models, employment of ADCAP and SEA LANCE will result in significantly improved survivability of U.S. platforms.

In the antisurface warfare (ASUW) role, the attack submarine is the acknowledged platform of choice for the most highly valued surface targets. In addition to the MK48 and ADCAP torpedoes, attack submarines are armed with both HARPOON and TOMAHAWK antiship missiles. All of these weapons can be effectively employed by the submarine against the full spectrum of surface threats.

The addition of twelve vertical launch tubes to our newer SSN-688 attack submarines has significantly enhanced the firepower of these ships, both in an antisurface and a land attack strike role. In this latter role, we can launch both conventional and nuclear land attack cruise missiles. Submarines with cruise missile capability, whether from horizontal torpedo tubes or vertical launch missile tubes, offer significant flexibility and leverage due to their covertness as a strike platform. Of course, the ability to strike from somewhere at sea makes a directional defense very difficult.

All of these submarine weapons exceed our original expectations for reliability and effectiveness. The highest possible degree of reliability is vital to a submarine which deploys for long periods away from a source of support in enemy controlled waters.

To ensure weapon reliability we have a well-established testing program consisting of technical and operational evaluations for weapons under development, and follow-on operational testing and service weapon tests for weapons in the fleet. Through these processes, we are able to assess the effectiveness of the weapons against an evolving threat and are able to gauge stockpile condition with respect to the number of different weapons needed to win the war at sea. With weapons like the MK48 ADCAP torpedo, we are able to improve the weapon rapidly using a block upgrade program, the most cost-effective and quickest method to correct deficiencies identified during a test program. In order to make testing even more cost effective, we employ sophisticated computer modeling systems and hybrid models to simulate submarine interactions in a wide spectrum of scenarios. Using these modeling systems, we are able to run thousands of scenarios at a fraction of the cost of one at-sea evaluation.

Maintaining superiority in acoustic sensor capabilities must be one of the major thrusts of our near term modernization program. Since the introduction of the BQQ-5 digital sonar suite in 1975, we have developed four major upgrades to the BQQ-5 sonar and are commencing the fifth. Each upgrade has further enhanced the BQQ-5 basic sonar sensor capability with additional sonar arrays and enhanced processing techniques.

INTEGRATED UNDERSEA SURVEILLANCE SYSTEM (IUSS) MODERNIZATION

The intelligence capability of IUSS is an integral part of our ASW defense and maritime strategy. IUSS consists of the fixed Sound Surveillance System (SOSUS) and the Surveillance Towed Array Sensor System (SURTASS) ships, integrated into a coordinated network. This total system provides acoustic information which greatly assists in the ASW prosecution of potentially hostile submarines. Around-the-clock operations provide early and timely information to the fleet so that commanders may react appropriately to the threat.

IUSS forms a critical, cost-effective part of our defense. The SURTASS program in particular, with its mobility, has contributed significantly to system effectiveness and flexibility in recent years and has provided an opportunity for ASW cooperative efforts with other allied nations. Currently, twelve SURTASS ships have been delivered to the fleet. On a continuing basis, between nine and ten of those twelve ships are at sea every day of the year. Ten more are under contract and I ask for your strong support for the initial ship of the new Small Waterplane Area Twin Hull (SWATH) Class in fiscal year 1990.

A RESEARCH AND DEVELOPMENT PROGRAM WHICH IS INNOVATIVE AND EXECUTABLE

When the SSN-21 joins the operational forces, it will incorporate all current submarine advanced research and development and represent the optimization of warfighting capabilities which can be realized through the evolutions of designs and the controlling features of today's submarines. Further major gains in stealth, tactical speed, sensor and weapons performance, and sustainability will depend on our willingness to develop innovative new technologies. The CNO put the issue in focus when he recently stated that we are at a watershed in naval technology and that a key element of our future warfighting capability will be the development of revolutionary technology as part of an overall research and development plan. Navy research and development organizations working together with our warfighters must identify pertinent revolutionary warfighting technologies, and develop realistic employment schedules and funding requirements to realize these revolutionary capabilities in the future.

In August 1988, the Navy initiated an integration effort for advanced submarine technology development through the establishment of an Advanced Submarine R&D Office, NAVSEA-92R. This organization headed by a material professional submarine admiral is independent of specific platform development within the Naval Sea Systems Command.

The key attributes of this integrated submarine technology development effort are to improve liaison among the various organizations which conduct R&D, and to evaluate, set priorities and transition technology into submarine programs. This effort applies to both forward fit into new designs as well as backfit into existing designs. The integration effort presents a systems approach to submarine technology with emphasis on accelerated fleet introduction through use of a submarine dedicated to research and development and the large scale vehicle (LSV).

To implement the Navy's submarine research and development effort the FY90 budget contains a request for the establishment of an advanced submarine systems development program. The intent of this program is to increase the technology base to provide design options not currently feasible and to provide a hedge against technology surprises. Planned new starts include the transition of technologies developed under the Congressionally initiated DARPA Advanced Submarine Development Program and the initiation of the Research and Development (R&D) Submarine Concept.

In April 1988, the CNO authorized designation of a 688 Class SSN as an R&D submarine to support rapid system prototyping. . A current fleet asset, USS MEMPHIS (SSN-691), has been designated as the interim R&D submarine. While maintaining full warfighting effectiveness this submarine will provide a readily available platform to deploy submarine-oriented R&D projects in an at-sea environment, thus allowing rapid prototyping of significant technology enhancements.

The long-term R&D submarine will be a 688 Class SSN scheduled to be modified during a regular 1993 overhaul. While including new concepts in submarine warfighting technology, the long-term R&D submarine will retain its warfighting capability and be capable of deploying in wartime.

The two principal civilian submarine construction shipyards completed conceptual designs for the long-term R&D submarine this past fall. Based on NAVSEA-92R's recommendation, we have approved the baseline. Some of the significant projects selected for the R&D submarine will support testing of composite hull structures, large diameter torpedo tube weapons, unmanned underwater vehicles (UUVs), advanced sonar testing and hull friction reduction systems. The long-term R&D submarine and the large scale vehicle will also provide platforms for the DARPA advanced submarine technology program prototype testing.

The Navy's advanced submarine research and development program will be the technological foundation for the next generation of attack submarines while still providing necessary innovations to current submarine classes. Your support of these new Navy initiatives is critical if we are to retain undersea superiority.

PERSONNEL

A fundamental ingredient to our undersea superiority, even beyond technological advances, is unquestionably our people. The extraordinary sacrifices of the men and women who man and support our submarines and undersea surveillance systems worldwide are a constant source of pride. Their demanding technical training, stringent qualification requirements, and arduous deployments are accepted as a matter of course, and their successful performance is crucial to maintaining our edge over any adversary.

The unique operational experience and technological talents of our submarine qualified and IUSS officers and enlisted personnel represent an invaluable national resource which, if lost, cannot be quickly replaced -- you cannot buy experience. Our personnel picture is brighter today, and we are grateful that the special incentives provided by Congress -- most recently an increase in nuclear officer incentive pay (NOIP) and in submarine pay -- have improved the morale of the force and increased retention. Nuclear officer retention has increased from thirty-nine percent two years ago to forty-five percent in FY88 and is directly correlated with increased NOIP and submarine pay. We have been able to recruit and retain sufficient high-quality personnel to man our submarines and provide a reasonable sea-shore rotation, but the delicate balance of the personnel equation cautions against placing unreasonable demands on our people. Submarine operating tempo is carefully controlled to avoid exceeding fifty percent time away from homeport (a goal strongly pursued throughout the entire Navy). We ensure that our military construction resources are efficiently used to provide better living conditions. Nonetheless, we are faced with the reality that our talent is continually being sought by industry.

I am concerned with the impact of the joint specialist/duty legislation on our submarine officers. The joint duty requirements of the Goldwater-Nichols Act will make it more difficult to properly manage our already short supply of nuclear-trained officers and possibly place the flag rank selection of our best nuclear-trained officers at risk. I strongly support the CNO's recommendation that we work together to ensure the requirements to develop joint warfare experience do not inhibit our ability to have our best fighting officers in operational command at sea.

SUMMARY

In summary, I hope you are as convinced as I am of the significant contribution the submarine force makes to our national security and our nation, and the cost-effectiveness of that contribution. With only twenty percent of the Navy's budget, we provide the only invulnerable leg of the country's strategic deterrent and a powerful force of SSNs that is the key to the successful execution of the maritime component of our national security strategy. With the start of the SSN-21 program, the next generation of stealth submarines, I fully expect an expansion of the attack submarine's mission spectrum.

The programs I have briefly outlined represent a balanced approach to support our submarines and our people, to continue our vitally important submarine modernization program and to initiate a submarine research and development program in order to provide the basis for our undersea superiority two generations hence. These critical programs are well managed and on track. With your continued support they will allow us to turn another page in fulfilling the prophecy of Sir John Fisher in "... realizing the full extent of the revolution in naval warfare and naval strategy the submarine will accomplish."

Senator KENNEDY. Mr. Moore.

STATEMENT OF ROBERT A. MOORE, DEPUTY DIRECTOR, SYSTEMS AND TECHNOLOGY, DEFENSE ADVANCED RESEARCH PROJECTS AGENCY, ACCOMPANIED BY DR. RONALD CLARK, DIRECTOR, NAVAL TECHNOLOGY OFFICE, DARPA; DR. THOMAS TAYLOR, DEPUTY DIRECTOR, NAVAL TECHNOLOGY OFFICE, DARPA; AND CAPT. MARC PELAEZ, U.S. NAVY, DIRECTOR, ADVANCED SUBMARINE TECHNOLOGY PROGRAM, DARPA

Mr. MOORE. Thank you, Mr. Chairman.

I would like to submit my full statement for the record. That statement is an unclassified version of a classified report submitted by DARPA as required by the 100th Congress. That report covers our Advanced Submarine Technology Program long-range plan and it is dated February 1989. It is the third such report on this program since the Congress started this effort in fiscal year 1988.

I would like to state some key points that bear on the Soviet submarine threat. That is a threat that we have to keep in view for the future in conducting the Advanced Submarine Technology Program. I want to summarize what we are trying to achieve in that Advanced Submarine Technology Program and mention a related initiative that we have also defined in response to the Congress, and that has to do with antisubmarine warfare.

I have edited my remarks for this open session and I can provide more detail later if you decide to go into executive session.

Mr. Chairman, we find ourselves in an extraordinary situation today with respect to submarine warfare. Congress, as you noted, has assigned the Advanced Submarine Technology Program to DARPA. There was a legal requirement on the Navy in fiscal year 1988 to send $113 million to DARPA to initiate this Advanced Submarine Technology Program.

In the fiscal year 1989 bill, Congress added $95 million to DARPA's budget to continue that program, and if the program continues beyond the fiscal year 1989 it will be with the dollars added by Congress.

In addition to that, Mr. Chairman, I would point out that the House Armed Services Committee established a panel of 10 distinguished experts to advise that committee on submarine and antisubmarine technology. That started in December 1987 when that panel was first convened.

The report was submitted in January 1989. A hearing was held on March 21 before a combined meeting of the R&D Subcommittee and the Subcommittee on Sea Power and Strategic and Critical Materials.

I would suggest, Mr. Chairman, that the events leading to today's situation are dominated more by the Soviet actions than by lack of United States action, and let us review the Soviet program and this is my perspective of the Soviet submarine program.

The Soviet submarine program is incredibly bold. It is technically very risky. From my point of view as a technologist, the Soviets try everything that they think might work for advanced submarines. It is a very extensive program.

I would also point out that it is an operationally unsafe program, as witnessed by the recent loss of the *Mike*. When you look at Soviet attack submarines, what stands out is that since our SSN-688 achieved its IOC in 1976, the Soviets have introduced five new classes of attack submarines, plus two new upgraded classes of submarines. And let me enumerate those.

In 1979 it was the *Victor III* class SSN; in 1978, the *Alpha* class SSN; in 1981, the *Oscar* class SSGN; in 1984, the *Yankee* class SSN; 1986, the *Mike* class; 1986 also the *Sierra* class; and 1988 the *Akula* class SSN.

In a decade, Mr. Chairman, that is five totally new attack submarine classes, while we did one. And when the SSN-21 becomes operational in 1995, it will be 20 years since the SSN-688 IOC.

Now, the Soviets have collectively, if you look across that force, not concentrating on the numbers but the different types of submarines and their capabilities, they have the fastest submarine, they have the highest power density submarine in terms of the number of kilowatts per cubic foot; and the only liquid metal-cooled reactor.

They have the deepest submarine, they have the hardest to sink, they have the largest SSBN, they have the largest SSGN, with the highest missile payload for a missile boat. They have the only nonmagnetic hull, made of titanium.

Now, we have the safest submarines, which is important, and we have the stealthiest submarines, and that is the most important characteristic or parameter for a submarine. So I think we have the best submarines overall.

They still have a lot of older, less capable submarines in their force, and one has to look at the total composition of the Soviet submarine fleet. And certainly, if my son were a submariner I would rather have him in a United States submarine than in a Soviet submarine.

Our force is superior and the people in our fleet I am certain are superior, led by Admiral Cooper.

What the Soviets can do with this capability should give us cause for concern. At DARPA we look forward to the long-range future and we try to think about the worst case and be prepared for that in terms of the technology that we pursue and try to demonstrate in DARPA programs.

What can they do with this advanced submarine capability? Well, certainly they can pose a greater threat to our sea lines of communication which are so important to our NATO defense strategy, which is based on rapid reinforcement of the limited forces that we have in NATO. They can pose a more severe threat in the future to our carrier battle groups and our surface action groups.

The *Oscar* is a very big boat. It can stand off outside of the range of our organic ASW capabilities within carrier battle groups, and the *Oscar* is very difficult to sink. It is a double-hull submarine and it is just very hard to put it under.

The Soviet submarines can potentially threaten our SSBN's. We have to be concerned about that. It is not a threat today, but we have to be concerned about how they might do that in the future.

Potentially, the Soviet submarines could launch submarine-launched cruise missiles and threaten the continental United

States with quiet submarines that could be very difficult to detect with our current surveillance capability.

And the Soviet SSBN's have the capability to operate in bastions, as Admiral Cooper pointed out, and we think that that is an important part of the overall Soviet strategy, to have a survivable strategic reserve force along with their land-mobile ICBM's.

So what should we do to counter this growing threat? Well, first of all, Mr. Chairman, I believe that we should get on with the SSN-21 program. And second, we should accelerate the development of Advanced Submarine Technology, which indeed the Congess has done, and that technology can be very valuable to the SSN that follows the SSN-21, and of course some of that technology can be used to upgrade the existing fleet, the 688's and the 21 after it is deployed.

We should shorten the time between new classes of submarines. Twenty years is just too long.

We should pursue a broad ASW initiative, and we are in a force on force game here and there are other things you do in ASW. We have submitted a program, as I mentioned, as required by Congress.

The ASW initiative should focus on the near term, it should focus on the midterm, and it should focus on the long term. It should exploit advanced technology, and there is a lot of it there that can be exploited.

We need to find new ways to do anti-submarine warfare. We need to take a combined arms approach, where many capabilities on different platforms are used in a coordinated operation in order to defeat the Soviet submarines.

And we need to pursue prototypes to demonstrate an improved capability early, to demonstrate to the Soviets that we can counter what they are doing with their submarines.

DARPA has established this ASW plan which complements the submarine technology plan. It addresses that future threat. In preparing that plan we drew on the country's best technical talent in order to put that program together. It is well thought out, it is broadly based, and that is before the Congress.

Now let me turn to the Advanced Submarine Technology Program and point out some of the things we are doing. The program is well established following its start in fiscal year 1988. I mentioned that we have submitted three reports to Congress. We have briefed your staffs. We have kept people informed.

The program objectives are: first of all, to continue to improve the stealth of our submarines to improve the survivability of our submarines in the future, drawing on technology that does that; to increase the payload capability of our submarines—the weight, the number of the weapons that the submarines can carry—to decrease the cost of submarines; and to reduce the manpower required to operate the submarine by exploiting automation technologies.

We think it is also important to improve the submarine's ASW sensors and its weapons and to expand the mission capability of submarines, because they do have that characteristic of stealth. And surface ships are becoming more vulnerable. Thirty-five countries have anti-ship cruise missiles. As we have learned, this can be a very serious threat anywhere in the world, and submarines come with stealth.

We expect some important near-term results. We expect that from our program in the very near term that we will have vastly improved the capability for using computers to establish the hydrodynamic design of our submarines, and that is important.

Solid state switch gear with a tenfold size reduction will come out of the program early; an electro-optical periscope, which provides flexibility and space in the arrangement within the submarine, a shorter exposure time, and allows a multi-spectral capability, for example operating with infrared as well as the visual capability.

Composite material which will give us a 5 to 1 increase in the strength-to-weight ratio for components on the submarine in the near term; and in the long term perhaps composite materials can even be used for submarine hulls.

In the long term, we will develop and demonstrate the capability to control the signature, to control the observables of our submarines, and maintain a very dramatic advantage in stealth compared to the enemy submarines.

To achieve a passive noise reduction is an important part of that; to control the active acoustic reflection from the enemy's active sonars, to control the non-acoustic signature of submarines, the wakes, the surface effects that are left by the submarines under certain conditions.

Also in the long term, we expect to achieve a sixfold increase in the payload potential for the same submarine size through the use of these composite materials, through the use of electric drive systems, and by automating the crew loading by about 50 percent. Eventually, we would like to be able to have submarines with sensors to maximize the capability of the submarine to detect enemy submarines.

What is important for DARPA is to be able to transition the products of its program, and we are working out a transition plan with the Navy, with Admiral Evans at the Naval Sea Systems Command. And we expect to be able to start transferring some major portions of our program in the fiscal years 1990 and 1991.

Some examples are the electro-optical periscope that I mentioned, some of the hydrodynamics work, which will be a well-established capability, the propulsor system; and then to gradually increase the amount of activity that is transferred to the Navy from DARPA, so that by fiscal years 1993 to 1994 we would have 60 percent of that program, let us say roughly $60 or $75 million per year, transferred to the Navy.

Mr. Chairman, in conclusion I thank you for this opportunity to touch on these points. This is an overview and some of the details appear in the classified report. We think this is a good program, this Advanced Submarine Technology Program.

Some of us were reluctant to take on this program when the Congress started it, but I must say now that most of us agree that it is a very good program. We are working very closely and very well with the Navy. We think that the products of the program are extremely important, and we believe that it will make a major contribution to our submarine capability in the 21st century.

Thank you, sir.

[The prepared statement of Mr. Moore follows:]

STATEMENT BY

MR. ROBERT A. MOORE

DEPUTY DIRECTOR, SYSTEMS AND TECHNOLOGY

DEFENSE ADVANCED RESEARCH PROJECTS AGENCY

Introduction

Mr. Chairman and members of the Subcommittee, I appreciate the opportunity to appear before you to address an extremely important undersea program in DARPA: the Advanced Submarine Technology Program. I want to address, specifically, program rationale, program objectives, new technologies, and program achievements to date.

The Advanced Submarine Technology Program was established by the 100th Congress and it is exploring a broad range of innovative technologies to provide options for future submarines. The program is of critical importance due to the roles that submarines play in our national defense and the fact that the Soviet Union continues to demonstrate significant progress in submarine capabilities with a concomitant expansion of mission and roles. It is this Soviet progress that alarmed the HASC Advisory Panel, which recently issued their report on Submarine Technology and Anti-Submarine Warfare. The report summarized the situation with the statement:

> "Though we saw no evidence as yet that the Soviet's ambitious R&D program has produced a submarine that is qualitatively superior to ours, their continuing, ambitious technology program may well produce such a submarine unless our own R&D efforts at least match theirs in scope and productivity."

It is important to note that the Advanced Submarine Technology Program at DARPA is addressing new technology that can be useful not only in ASW, but across the full spectrum of missions that a submarine may be called upon to execute. A primary example is stealth technology, which will allow our future submarines to operate in forward, contested areas with little fear of detection.

The budget for this program was established by Congress at $113 million for FY88 and $95 million for FY89. It is proceeding according to this original plan and making excellent progress. The program now has 195 contractors, 9 universities, 3 national laboratories and 5 Navy laboratories working. As I indicated before, funding of the program in FY90 and beyond is not included in the budget request.

From the FY 1988 and FY 1989 funding we have some very beneficial near-term results that we will demonstrate to the Navy by 1991 and have initiated the ground work for significant long-term submarine design improvements.

Among the near-term results are:

- A light-weight composite propulsor that provides a 40-60% weight savings and profound reduction in magnetic signature;
- A non-hull penetrating fiber optic periscope and sensor system;
- An electro-magnetic countermeasures launcher;
- Electro-magnetic machinery bearings;
- Order-of-magnitude reduced size, high-reliability solid-state electrical transmission devices using metal oxide semi-conductor technology;
- A national caliber hydrodynamic computational facility at a navy laboratory;

Among the long-term results are initiatives directed toward:

- Advanced submarine electric drive that will allow us great flexibility of design and enhanced survivability;
- Full automation to improve stealth, allow radical maneuvering, increase survivability through improved damage control, and reduce cost and size by decreased manning;

- Increased stealth through the application of a number of classified technologies.

Program Rationale

The Advanced Submarine Technology Program is addressing innovative technologies that will improve the key performance attributes at a reduced cost. The submarine's overriding attribute is its ability to remain undetected, i.e., stealthy, during selected portions of a mission. Following stealth, two equally important attributes are survivability in an engagement and effective payload delivery. To optimize the value of these attributes, the physical characteristics such as speed, operating depths, and acceleration must be analyzed using a systems approach and mission requirements.

Program Objectives

The objectives of the Advanced Submarine Technology Program remain as reported to Congress in our recently submitted Long Range Plan:

- Identification and development of promising and revolutionary technology that can provide new and innovative design options for future U.S. submarines;
- Mobilization and focusing of industrial, university, and government research and development talent to significantly improve future submarine performance;
- Demonstration of advanced technologies and systems by rapid prototyping.

Program Achievements

In response to an April 1988 Broad Agency Announcement, we have received and evaluated almost six hundred proposals from industry, non–profit organizations, government laboratories and universities. The total value of all proposals was over $4 billion. Only the proposals that offered the highest payoff were selected for award. The message has gotten through to industry— we are looking for innovative technology and advanced concepts even if they conflict with the "conventional wisdom." An example is magneto-hydrodynamic or MHD propulsion which may propel our future submarines silently without the need for a propellor, reduction gears or drive train.

The program has established a forum for visionaries using workshops and symposia. In addition, the program has pursued university involvement to train new engineers and scientists who have an interest in submarine development. Furthermore, university involvement is occurring through a cooperative effort with the Office of Naval Research.

Technology Timing

It is particularly important that I comment on the implications of timing and long-term commitment toward the development of future submarines. A number of enabling technologies being explored in the program, such as superconductivity, vastly improved computer power, and advanced materials may allow us to make order-of-magnitude changes in how we build, operate, and maintain submarines in the future. However, much of what we are doing today will not be available for a decade or more. In other words, the submarine technology program is not in competition with the Navy's on-going building programs such as the improved SSN688 and the SSN21; but complementary, when viewed in the time-frame of the next twenty-five years. As I will discuss later in more detail, from a perspective of timing, it is important to establish a firm basis on which to transition technology to the Navy that is compatible with their resources and needs.

The DARPA/Navy Program Relationship

The Advanced Submarine Technology Program is consistent with our DARPA charter to pursue high-risk technology that promises high utility in military payoff and allows us to explore revolutionary technologies. Having the Advanced Submarine Technology Program at DARPA is consistent with the HASC Advisory Panel report recommendation that research on advanced submarine technology should continue in both the Navy and DARPA, and that the two should be independent in approach, but not in planning. We can be "constructively adventurous" and move out ahead of formal requirements to pursue the risky course usually shunned by others; in addition, the Program directly benefits from the synergy of other ongoing DARPA efforts in materials, superconductivity, unmanned undersea vehicles, laser communications, and advanced computer technology.

I am pleased with the degree of coordination taking place between DARPA and the Navy in this Program. The Navy's recent initiative discussed by VADM Cooper in his March 2 statement to the Seapower and Critical Materials Subcommittee to establish an integration effort for advanced submarine technology development through an advanced submarine R&D office, NAVSEA 92R, is an example of their cooperation. Adequate funding of this effort is necessary to efficiently transfer DARPA's technology developments to future systems. We intend to work closely with NAVSEA 92R to stimulate transition planning that will take advantage of what DARPA has done and smoothly fit into the Navy's acquisition cycle. Our mutual efforts are being close-coupled to prevent "re-inventing the wheel" and to maximize our finite resources.

One of the biggest challenges for the program will be demonstrating the emerging technologies to the necessary degree that they can successfully transition to Navy programs. Projects like electric drive, submarine automation systems, composite hulls, and fuel-cell power systems are expensive to bring to fruition. The Advanced Submarine Technology Program is a mechanism to sustain these high-payoff projects that will yield improved submarine forces for the 21st Century. We appreciate the continued support of the Congress.

Conclusion

I hope I have conveyed to you the importance of the Advanced Submarine Technology Program as an important element of the DARPA Undersea Warfare Technology Program. The program is accelerating the development of high-payoff technologies for submarines beyond the SSN-21. Limited to hull, machinery and electrical applications, the program is focussed on improving submarine stealth, survivability, and payload while maintaining affordable costs. Significant strides have been made in what must be a long-term process. The establishment of an innovative technology base and infrastructure for future submarines has only begun. With the support of Congress, we have made substantial progress. However, the challenges facing us in technology and resources are severe. We must make a sustained commitment to a continuing program, executed by both DARPA and the Navy, if the challenge of maintaining the superiority of U.S. submarines is to be met.

Senator KENNEDY. Thank you very much, Mr. Moore.

I want to consider the possibilities of a brief executive session later on at the conclusion of the meeting. If you have some material you think would be valuable in terms of responses to these questions, if you would indicate that, and then we will come back to them in the course of a brief executive session.

OPERATIONAL TEST AND EVALUATION

Admiral Cooper, the operational test and evaluation in the form of field tests under realistic combat conditions is required by law prior to committing to a full rate production. What is the full rate production of an SSN-21?

Admiral COOPER. The full rate of production of the SSN-21 is difficult to define. I would say anything over four ships per year would be a high rate of production or a full rate of production.

Our current SSN-21 building plan is one in fiscal year 1989 and then zero in fiscal year 1990 and two in fiscal year 1991. The law as I read it talks to weapons and weapons systems. I was somewhat surprised GAO said they felt that the law applied to the *Seawolf* a shipbuilding program.

We are talking about three and four ships a year. If we had to wait, for instance, under the law, until we did all the testing, that would mean from the time we started the first *Seawolf* until the time we actually got the second one to sea would be about 14 years.

Senator KENNEDY. Well, that is the problem. I am trying to first of all find out whether we are doing it the most efficient way. That is one of the reasons for the full rate production question.

As I gather, your answer is that when you move to two or three you are getting the maximum rate of production, is that what you are telling me?

Admiral COOPER. I would say four.

Senator KENNEDY. Four.

Admiral COOPER. I would say four, yes, sir.

Senator KENNEDY. So for anything less than four, then we are paying for a good part of the overhead?

Admiral COOPER. Yes, sir.

Senator KENNEDY. Have you quantified that? Maybe you can provide that later on, so that we find out what we are paying for in overhead in terms of keeping production lines open.

I think it is part of the system, but I think it is important that we have some——

Admiral COOPER. Yes, sir. Let me get together with the project manager and I will give you a better answer for that.

Senator KENNEDY. Okay.

[The information follows:]

A reduction of the proposed *Seawolf* building rate is unacceptable in view of the projected Soviet submarine threat. The current proposed production rates for the *Seawolf* submarine support the 100 SSN force level which is the linchpin of the United States' Maritime Strategy. In addition, significant cost increases to the *Seawolf* construction program will be reflected in follow-ship production if currently proposed building rates are reduced.

For example, if the SSN-21 program were reduced to one hull per year with both shipbuilders still involved, it is estimated that unit costs would rise in excess of 40 percent. Additional cross program impacts will occur on the *Trident* and CVN programs with unit cost increases of 20 to 25 percent and 5 to 10 percent, respectively.

The relative range of these percentage impacts are driven by the industry's ability to control overhead costs and productivity during very low rates of production.

CHANGING THE LAW

Senator KENNEDY. The other, do you have recommendations on how we ought to proceed, given the GAO consideration? Do you have recommendations about whether there ought to be changes in the law?

I know in your discussions with me you point out that submarines are a good deal different, obviously, than other kinds of weapons systems. There is going to be mass production of these weapons systems, given the limited number.

But clearly, we want to make sure that whatever is going to come into the arsenal is going to do what it is required to do. What recommendations do you have for us about the way that we ought to proceed, or are you prepared to make any now?

Admiral COOPER. I think you will find the Assistant Secretary for Shipbuilding and Logistics is working on proposed wording to modify the law. It seems to me you either need to change the law or you need an interpretation that the committee would agree with that says, in accordance with this law, the rate of initial production or full rate is such-and-such, for a given weapons system.

Of course, we have laid out a plan for *Seawolf* risk mitigation. With the scheduled component testing we have and are doing at sea, the ongoing shore component testing and computer modeling and simulation—we are hoping that we are able to satisfy everybody that in fact the total *Seawolf* system itself, will work because each of the components has been tested, and then will be tested with each of the other components.

Senator KENNEDY. When will we get that?

Admiral COOPER. We are working on it now. You are talking about wording, possible wording?

Senator KENNEDY. Yes.

Admiral COOPER. Yes, from Mr. Pyatt. My guess is that hopefully the Navy would be able to provide you something shortly.

However, OSD will want to address the issue themselves because it is a total OSD problem.

CHARLES STARK DRAPER LABORATORIES

Senator KENNEDY. The Charles Stark Draper Laboratories has been hired by the Navy to provide expertise in defining systems requirements, engineering and technical reviews of the design and development of the combat system, independent assessments of the proposed system architecture and identification of areas of technical risk.

What has been the role of the Draper Laboratories in reviewing the BSY-2 development effort?

Admiral COOPER. I will defer to Admiral Volgenau if I may, as the BSY-2 project manager.

Let me say, however, originally I know that we had selected Draper to review the BSY-2 development effort as an independent agency. The Naval Undersea Systems Center in Newport is the current independent evaluator.

Admiral Volgenau will give a further answer to that.

Admiral VOLGENAU. Mr. Chairman, the Charles Stark Draper Lab was brought on early in the design definition phase of the combat system to assist us in ensuring that we had a well-balanced system. They continued to work on through the contract award period and provided us some assessment with regards to software and the risks associated with that and some of the overall program management observations of the progress of the contractor in achieving the goals of the combat system.

One of the early assessments that they provided gave us an indication that perhaps the contractor was not manning the program sufficiently at the start to meet the requirements, and we took action to work with the contractor to ensure that was done.

Currently they are phasing out of assistance in the assessment arena.

Senator KENNEDY. What technical risks has Draper identified thus far? Have there been any?

Admiral VOLGENAU. The primary technical risks that they dealt with was the magnitude of the software package to get the combat system satisfactory.

Senator KENNEDY. What was the nature of their criticism?

Admiral VOLGENAU. It was not a criticism, Mr. Chairman——

Senator KENNEDY. Or their observation?

Admiral VOLGENAU [continuing]. So much as it was their observation of the magnitude of the software program and the need to ensure that we took the necessary risk mitigation factors to ensure, enhance the chance of completing the software program successfully.

Senator KENNEDY. What was you response to that?

Admiral VOLGENAU. Well, we have worked very closely with the contractor, and we feel that we have taken a number of risk mitigating initiatives into consideration in the software program to reduce the risk and enhance our chances of success in the combat system arena.

UNDERWATER SYSTEMS CENTER

Senator KENNEDY. Admiral Cooper, you made reference to the Underwater Systems Center to do certain verification and validation on the BSY-2. Should not that verification and validation agent be an entity independent of both the contractor and the customer?

Admiral COOPER. My opinion is the primary reason that we have NUSC is to do verifications and testing. I think they can be considered as independent of the project manager and the ongoing work.

NUSC does not come under, for instance, the Naval Sea Systems Command, as does Admiral Volgenau and his office. So the people that are putting BSY-2 together are in a different component of the Navy. The NUSC laboratory in fact comes under another entity.

So I think NUSC can be considered independent.

Senator KENNEDY. This was, even given the capability, was a point that was raised in the GAO study.

Admiral COOPER. Yes, sir.

BSY-2 SYSTEM

Senator KENNEDY. Admiral, just to continue on that BSY-2 system, I think many of us are familiar with the Aegis systems and all the difficulties that that had in transferring to the DDG's. It took a long period of time, some 20 years perhaps, to get the problems worked out on that.

What kind of—given the magnitude of the BSY-2 system and the fact, the timeframe, where you are moving from actual design, from the detailed design in 1990 to 1992, the production—I guess it is from 1989 to 1993. So you get a very short period of time, from 1990 to 1992, and the production even a limited period of time.

Given the complexities of the system, how confident can we be that you are going to be able to meet the expectations and the assurance that have been given to the Congress and the American people that this is really doable?

Admiral VOLGENAU. Mr. Chairman, we are fully cognizant, I believe, of the magnitude of the task ahead in delivering the combat system, and we are aware of the risks associated in a large software development program.

The contractor is well aware of the fact that we cannot do business in this combat system like we did for the Aegis program. We have done a number of things in this program which we feel have brought the risk to a manageable level.

This organization which I head was formed in 1985 as a result of the SUBACS problem that Congress was well aware of, and we incorporated the lessons learned from that program in the design of the BSY-2 system for the SSN-21. This involved such things as a focused organization for submarine combat systems, they put a flag officer in direct oversight in the management chain, the program manager was hand-selected.

There is a strong Navy team, which includes the Naval Underwater Systems Center as the technical direction agent and several other of the field activities of the Naval Sea Systems Command.

We had established, early on in the program, stable system performance requirements. We went through a 2-year design, detailed design definition period with two of the best contractors we have in this business, contractor teams, and the result was a program that was well defined and designed.

The contractors were free to select design within the Navy's set bounds, and this allowed the specifications used for the bidding to mature such that we ended up with a good bid to good specifications.

We minimized the technology risk by building on the current existing technologies. So at the time that we went through the source selection and awarded the contract, we had incorporated the lessons learned from our mistakes in the SUBACS area and we had gone through a very careful design definition period.

In the software development, we have done a number of risk mitigating things which we think significantly enhance our chances for success. It has been established in accordance with the latest Department of Defense guidelines, and at the time we proceeded to the Defense Acquisition Board in early 1988, Dr. Costello said that the program—he was impressed with the software program that we had established and thought it perhaps should be a model for other software programs.

We had thorough software specifications and design. The software package is divided into small groups of small building blocks. This permits us to build a little and test a little philosophy, which allows an early identification of problems such that they can be corrected.

We are using common development tools, and we have an aggressive training program in the software—the contractor has an aggressive training program in the Ada software, which as you know is required to be used in the program.

In addition to that, we have early and thorough governmental technical oversight. So we are optimistic that the program can be done within the allotted time. We have a solid contract with a solid contractor. We have good government oversight.

We recognize that there is a challenge ahead, but we are committed to meeting the requirement, sir.

Senator KENNEDY. A very complete answer. You anticipated that question coming.

Admiral COOPER. Let me add that there are very thorough program reviews by both the Navy internally and by OSD, who have designated special committees to audit the BSY-2.

Senator KENNEDY. Senator Cohen.

SHARELINE

Senator COHEN. If I could follow up, Admiral Cooper, how come we have an 80/20 shareline on this particular ship?

Admiral COOPER. My understanding from talking with Mr. Pyatt, was because the SSN-21 leadership was new, there were some new technology risks and that was the reason the contract shareline was 80/20.

Senator COHEN. The standard contract is 50/50?

Admiral COOPER. The standard contracts over the last few years have been 50/50. However, I think prior to about 1983 we ran as much as 85/15.

Senator COHEN. Well, in this particular case it is what, $1.7 billion? If our oversight is not as good as was just explained and the contractor ends up forfeiting some $30 million, we have got $120 million to come up with on the part of the Navy.

Have you got that kind of money in the budget?

Admiral COOPER. I do not right now. I have the money to cover the submarine, and of course, obviously, if something happens then I will have to come back to Congress and ask for it.

Senator COHEN. So the rationale is that this is a new ship requiring new technology?

Senator COOPER. That is correct.

Senator COHEN. And more incentive for the contractor and greater liability for the Navy in the event he does not perform?

Admiral COOPER. I would say that is correct, yes, sir.

Senator COHEN. Mr. Moore, I think in talking about the Soviet system you said that they were building too many classes of ships, too fast. Is that right?

Mr. **Moore**. I did not say that specifically. What I said was that the program was technically very risky and of course very unsafe, just looking at the facts.

Senator **Cohen**. Well, was it because of the rapidity with which they are putting out new classes of ships? I mean, I was not sure why you said what you said. You pointed out how many new classes they have developed in the past decade compared to the one that we still have at this point, and then you indicated that they had certain safety problems.

I got from that the implication, because they are cranking them out so fast, that they are ignoring the safety features on them. Is that an incorrect assumption on my part?

Mr. **Moore**. I think that is probably a good reason why they ended up with submarines that are not as safe. They are willing to go ahead with a submarine that is very risky. They take more risks. They are willing to put their people at risk.

Senator **Cohen**. In what sense?

Mr. **Moore**. In the sense of unproven designs and going ahead, for example, with the liquid metal-cooled reactor before that is proven and before all of the safety issues are dealt with.

In U.S. submarine design, as I recall, Admiral Rickover was reluctant to take that risk, for what probably proved to be good reason. But they are willing to go ahead and live with the risks and put the crews at risk with designs that are not proven to be reliable and as safe as we would require by our standards.

Senator **Cohen**. Well, on the one hand they are moving too rapidly, with too little concern for safety. On the other hand, you indicated we have got to do more in a shorter period of time.

So on the one hand, they are doing too much, minimizing safety; on the other hand, we have been so concerned with safety, we have minimized production.

Mr. **Moore**. Yes.

Senator **Cohen**. On the margin, are they better off having produced more in a shorter period of time, sacrificing safety? Or are we better off, having produced less, proceeding more cautiously, with higher regard for safety?

Mr. **Moore**. Well, I do not agree with one of your premises, and that is that we have been too safe. I do not think that our problem in that 20 years between submarine classes is that we have been too safe. I would not attribute it to that.

Senator **Cohen**. What has been the problem?

Mr. **Moore**. I think the problem is simply priorities and funding.

Senator **Cohen**. Well, priorities in the funding, you say, of ships?

Mr. **Moore**. Yes, yes, sir.

Senator **Cohen**. All right.

Admiral **Cooper**. Excuse me, Senator. May I say one thing as the representative of the submarine force? There is no doubt in my mind that the submarine force we have today is superior to the Soviet submarine force, for many reasons—the technological aspects of the submarine, whether it is the quieting, the fire control system or the very reliable and maintainable nuclear propulsion system that we have, and especially the people that we have on board our submarines.

So I would like to make sure, if we talk about the quality of the two forces, there really is a great difference in our force versus theirs. Numbers is a problem at times.

Senator COHEN. I was reading an article in the U.S. News & World Report which in essence called the *Seawolf* a sea dog in terms of its capabilities and promise, and I was going to ask you a couple of questions for the record, and perhaps you could rebut some of the statements.

Jan Bremer, who is a scientist at the Naval Postgraduate School in Monterey, indicated that the 10-year lead that the United States had in quieting capability has been reduced to 3 years or less, and that Navy officials also acknowledged that the computer-calculated exchange ratios of expectable submarine against sub losses that significantly favored the United States in the sixties, are now also reduced.

Do you agree with that statement?

Admiral COOPER. No, not precisely. I think that we have seen a reduction, as I said, in lead. However, as we go out and interact with the various submarines, I think you will find that we do very well in looking both at the quieting and at the capability of the submarines themselves.

When you look at computers, simulation and modeling runs to see how we did in the past we in fact were at a great advantage. We think we will get back to that margin with the SSN-21. We feel with the improved 688 that we still have a good advantage.

I think as far as the whole article in question went, I think I feel rather unfortunate in that I was asked if I wanted to be interviewed by this person before they wrote, and I chose not to. I think if I get the opportunity again I will talk to that reporter.

Senator COHEN. It will probably still come out the same way, I would forewarn you.

Admiral COOPER. I am afraid you are probably correct.

Senator COHEN. John Engelhard, a Navy sub specialist, predicts that by the year 2000 the United States will lead the Soviet Union in only 2 of the 14 measures of performance, namely crew quality and passive sensors. What do you say about that?

Admiral COOPER. I do not know Mr. Engelhard and therefore I do not know where his degree of expertise in submarine technology lay. However, everybody I talk to, feels that conclusion is not correct. We feel that, particularly with the SSN-21; its sensors, quieting, propulsors, all these capabilities we have built into the ship, there is no way his conclusion could be factual.

Senator COHEN. It also says, of course, that the Soviets are trying to achieve speeds of 50 to 60 knots and be able to dive to 6,600 feet.

I think you indicated before that—I assume it is a law of physics—that the faster you go, the more noise you necessarily have to make, and that if they seek to achieve those kinds of speeds, I think I have seen one statement or report up to 75 knots on some of their subs, that that necessarily is going to make them noisier?

Is that correct?

Admiral COOPER. That is absolutely correct. Everything we have seen, indicates higher speeds make them much noisier. It makes us slightly noisier. But when you go at that speed, you might as well go out in an absolutely dark room, because there is no sensor that is going to be able to give you enough safety and forewarning.

In my estimation, those are very poor parameters to judge overall capabilities. What is more important, his parameters for the SSN-21 just offhand are wrong.

If you have to face a deeper diving submarine, it is not a major problem. With the depth and the capabilities of our submarines, we can detect him shoot a torpedo and we feel our torpedos will be able to attack that submarine.

Senator Cohen. Tell me, why would the Soviets do something as foolhardy as that?

Admiral Cooper. I do not know. They have always been of the opinion in almost everything they do that bigger is better, faster is better, deeper is better. We do not agree.

Senator Cohen. So the *Typhoon* does not cause you many anxieties?

Admiral Cooper. Well, it does cause me anxieties and it is a very competent submarine. It is not the quietest submarine in the world today. Our Trident and our 688 are quieter than the *Typhoon*.

NEW TECHNOLOGY

Senator Cohen. How about this new technology? Is it being shared with Toshiba or any of our other allies?

Admiral Cooper. You are talking about the Toshiba Konigsberg problem. That technology of course gave the Soviet Union the capability of reproducing screws the correct way. It thus gave them a jump, an advance in their quieting capability.

It just gave them an improved capability over what we expected them to have. However, we feel again that we can keep up with them.

ADVANCED TECHNOLOGY

Senator Cohen. Mr. Moore, you have pointed out how generous Congress has been in recent years in talking about advanced technology. Assuming that you are not talking in the neighborhood of $100 million in the future on an annual basis, but $50 or $25 million or less, what does that do in terms of your program that you were reluctant to get into in the first place, but once having seen the benefits of that research are now quite excited?

What do we expect from you now if we have this kind of reduction of spending?

Mr. Moore. Well, if we cut the program in half, Senator Cohen, I think there are many important technologies that we will not be able to pursue, and so we are going to pay for that in the 21st century.

The program needs to grow, not to be reduced. And I find myself in a fortuitous situation, in that the Congress has asked for a report that lays out the technical requirements and the funding requirements for a program to meet the goals as stated by Congress, and we have done that. We have done it very carefully.

So we have the opportunity to explain to you that a certain amount of money is required as a function of the fiscal years in order to carry out this program that the Congress has asked us to plan, and so it needs to grow. And there are the important elements—we certainly would have to prioritize, but there are very important elements of that program we would just have to drop.

Senator COHEN. Well, I think when Congress decided to cut the SDI Program they obviously thought it meant the submarine defense initiative as well.

That is all I have right now, Mr. Chairman.

ADVANCED TECHNOLOGY

Senator KENNEDY. At some time that advanced technology effort has to transition into the Navy. Can you tell us how that is taking place now and how you see it in the future?

And then I might ask Admiral Cooper to respond.

Mr. MOORE. Well, I would say first of all we sort of transitioned back to the Navy a couple of activities which they were unable to fund after this action was taken by Congress to move money from the Navy to DARPA, and those were the advanced steel, the submarine steel, HY-130, to prove that at sea in proof tests.

Second, to continue a program which the Navy has started, which became a part of our program, and that is the magnetic bearings, which is very important to the stealth of future submarines.

As we look forward and address the question of transition, we believe that the Navy is prepared to take over portions of the program in fiscal year 1990 and more of it in fiscal year 1991. We would expect that in fiscal year 1990, as I mentioned, that the hydrodynamics work that we are pursuing to develop computational techniques for the hydrodynamic design of a submarine, that large portions of that could transition back to the Navy with a sort of operational computational capability at the David Taylor Center; that the fiber optic periscope work that we have started could transition back to the Navy; that the composite propulsor could transition to the Navy and that that could be proven in tests at sea.

Then every year we would send more of it back to the Navy, and I think that we would want to be assured, and I would think that the Congress would want to be assured, number one, that the Navy will see those projects to completion. And the test of that is whether or not it is in their 5-year plan, and so we would look for those signals.

We think that the Navy is prepared to start that transition process, as I described it, perhaps with 20 percent of the program having transitioned to the Navy by the end of fiscal year 1990.

Senator KENNEDY. Senator Cohen.

Senator COHEN. Thank you, Mr. Chairman. I come back to this question about Soviet intent. It may be too complex for us to go behind exactly what goes into Soviet calculations, but it seems to me that we have persistently or, I should say, consistently underestimated Soviet gains in technology.

When we started pointing at the strategic systems on SS-18s, we said they are big, they are inaccurate, but the one thing they had was great lift capacity. And we found out that over the years they improved their accuracy a great deal, thanks to some more western technology, Vermont-made ballbearings and other things.

They have got a very powerful, very heavy throw-weight capacity which causes us enormous gastrointestinal problems. And I would say that in a variety of areas that I am familiar with going through the Intelligence Committee, almost every time that we point to something that the Soviets are doing we sort of minimize the significance of it, depreciate its long-term value.

Then, lo and behold, a few years later we say, my God, we did not realize they are making these kind of gains. So I tend to at least be a little bit skeptical, frankly, to suggest that they are trying to develop a submarine that is capable of 50 or 60 or 75 knots or capable of diving 6,600 feet and dismiss that simply as being part of the old Soviet mentality of bigger is better and faster is necessarily better.

There has got to be something more significant than that kind of an old paranoia and perhaps Soviet envy system, if I could say it in the open session here. But I think there is more to it than that, and I think we have got to be a little bit more cautious in how we estimate their technology. They do extraordinary things with their technology.

Time after time I have been reassured that they simply could not possibly have this kind of advanced technology, and time after time we have ended up being surprised. So I just say that with some—I think I may tend to agree with you, Admiral Cooper, but there is something troubling about this.

Thank you, Mr. Chairman.

Senator KENNEDY. Thank ygu very much, Senator Cohen.

I have started my second round, but I will yield to Senator Exon, then I will come back to my questions.

Senator EXON. Thank you very much, Mr. Chairman.

Welcome, gentlemen. You made a very interesting and comprehensive presentation, and we appreciate being brought up to date. I have a few questions.

SHARING NUCLEAR TECHNOLOGY

First, Mr. Moore, you know that last year, the administration was talking about giving our nuclear technology to the Canadians. Many of us, including most of the experts, as I understand it, in the submarine force thought that that was a tremendously dangerous thing to do. And I guess the issue is by the boards now.

But I still think that other nations should have alternatives to nuclear power. I am not suggesting that we have anything other than nuclear-powered submarines. We have had wonderful success with them. That does not mean, though, that we should not be looking around for other possible alternatives, if not for ourselves, for some of our allies.

With the success that we have had with nuclear power, I can imagine why our allies are looking with covetous eyes on our programs. But I think our nuclear program has been successful primarily because of the intelligent way that the Navy has handled it. We just have not had any accidents. And I compliment you for a job well done. I am talking to the people in the Navy.

Mr. Moore, getting back to DARPA, we gave DARPA some money to do some experimentation on other than nuclear drive for our submarines. I have made several inquiries of DARPA on that, and I have not yet got the impression that DARPA is following the right road.

Certainly fuel cells seem to hold some promise. Are you doing any work on fuel cells, and if so what can you tell us about that in open session?

Mr. **Moore**. Yes, sir, we are doing work on fuel cells. But I would like to say as a premise that, you know, if we did not have nuclear propulsion on submarines, we would have to invent it, because it is so efficient and safe and gives great performance capability to the submarines.

But we are pursuing, as the Congress had directed us, non-nuclear propulsion for submarines. We are somewhat handicapped in that we are forbidden from looking at advanced nuclear propulsion. But we are directed to look at non-nuclear propulsion.

We are looking at fuel cells. We are investigating advanced fuel cell technology. We have funded at least one contractor to do that. We are looking at what the Germans have done. They have been working on it for a long time, since they do not have nuclear capability for their submarines, and they have made a lot of progress.

It is a very interesting technology, particularly for auxiliary propulsion. And in addition to that, we are looking at magnetohydrodynamics, which is a term that applies to the applying force to a fluid by passing a current through the fluid perpendicular to a very strong magnetic field.

That is an old idea. I worked on it myself as a young engineer, and there is still some hope for it. But you know, it is not as efficient as other forms of propulsion.

But we think we are faithfully pursuing the non-nuclear option, Mr. Exon. And if I could ask one of the people, perhaps Captain Pelaez, to elaborate on that if you would like.

Senator **Exon**. Please do so.

Captain **Pelaez**. Yes, Senator. Very briefly, I think it is important that when we looked at this question—and I am familiar very much with your correspondence—we tried to take a good look at the whole systems approach to non-nuclear propulsion.

There are a tremendous number of advances besides the power source that are necessary to really revolutionize non-nuclear propulsion. Amongst those, for instance, would be the electric drive unit itself. Clearly we are talking about electric power sources of various kinds.

We have a significant investment in electric drive, advanced electric drive concepts, to try and make them practical and quiet. In addition, when you are talking electric drive, which is what, as I said, the non-nuclear power sources are, then you have to look at new technology for handling the great amounts of power that need to be transferred.

We have identified and are developing, for instance, a solid state power switch which is well over an order of magnitude smaller than anything that is available today on the market. This should enable us to get considerably more power out of existing and identified power sources.

So I think what we have undertaken is very much a balanced program, with probably 20 to 25 percent of the total resources devoted towards propulsion-related items in the nonnuclear area—electric drive and solid state devices, batteries, and fuel cells.

I hope that answers your question, and I am happy to provide more detail.

Senator EXON. That is a very good answer to the question. I appreciate it very much.

TORPEDOES

Admiral Cooper, I would like to switch to you if I might. As you know, we had a pretty horrible experience in World War II with what we thought was a very effective torpedo inventory. From what I have read and studied, the torpedoes worked out well in tests, but when we started firing them in World War II I understand that we had horrible results.

I assume, and do I assume correctly, that we have very effective combat simulated tests now for our torpedoes to make certain that they are as good as we think they are?

Admiral COOPER. Yes, sir, I would say we have very good weapons tests. Primarily, I rest this conclusion on the fact that last year we fired 1,500 torpedoes, mostly Mark–48 and some of the Mark 48 Advanced Capability, which we are bringing on line right now.

Every one of my submarines will fire six to eight torpedoes every year on a special instrumented range so we can tell, one, exactly what solution they had in the fire control system, and then also tell exactly where the target was, and finally tell how the torpedo did going against that target.

I would say we have about as good a testing system on the torpedoes, the fire control systems, and the entire weapons system, which is the ship, as any other person can talk about.

Senator EXON. You are fully satisfied and the tests that have been made under combat conditions are highly satisfactory, is that a fair statement?

Admiral COOPER. Let me make sure that I answer your question correctly. The weapons tests that we have run have been very, very good tests.

MARK 48 TORPEDO

The Mark 48 Advanced Capability torpedo which we are building right now has satisfied and exceeded every expectation that we established in 1984 to 1985 when we started building the torpedo.

Since then we have seen some improvements, both in the target or the threat. We have also come up against a couple of other things that we want to test against. We are in the process of testing against those new requirements now and have already paid for or are in the process of paying for improvements to making the torpedo perform better against the projected threat.

The fact is the torpedo we have meets every specification that we set up for it to meet. The MK–48 ADCAP is the best torpedo in the world today. There are additional improvements that we still must make and we are in fact paying for those.

Senator EXON. How about the older inventory of torpedoes? How do you rate those?

Admiral **Cooper**. We only have essentially two torpedoes in our inventory right now. One is the Mark 48 torpedo, one in the Mark 48 ADCAP. The Mark 48 torpedo is a very competent torpedo.

We have also made improvements in it. The Mark 48 ADCAP is a prompt jump in capability. So the Mark 48 torpedo is a very competent torpedo against the targets we would shoot. However, it is not as good, obviously, as the Mark 48 Advanced Capability.

Let me mention one more thing, too, if I may, Senator. About six times a year we shoot these torpedoes in what we call a service weapons tests. A service weapons test is where we shoot either against a target with an actual warhead on the torpedo. We shoot either against some special target set up or we shoot against a hull. We will tow out to sea.

For instance, a year ago we conducted a service weapon test in the Mediterranean on the "Line of Death," as stated by Mr. Qadhafi. We actually sunk an old Italian hull that was out there. Very, very fascinating pictures that we took at the time, where the hull actually went down within about 3 minutes. The torpedo proved to be very competent.

We do every bit of testing that we can possibly do.

Senator **Exon**. Thank you for that.

TORPEDO TESTING

It seems to me that increasingly we have noticed that large, long-range, highly accurate torpedoes may pose a greater destructive power against our surface ships than cruise missiles. I am asking the question to get from you a response as to what we are doing with regard to countermeasures to torpedoes.

Are we making any significant progress in that area?

Admiral **Cooper**. I really cannot address that, unfortunately. My surface comrades I think could answer that better.

We are testing our torpedoes against various types of countermeasures, but I cannot really talk to you concerning the types of countermeasures the surface ships are using right now in our Navy.

Senator **Exon**. Thank you.

Mr. Moore, grab the microphone. I would like to have your answer to that question.

Mr. **Moore**. Thank you. Yes, it is a problem that we have been thinking about at DARPA and looking at some advanced technological concepts that might eventually give us the capability of an anti-torpedo weapon, and it is a very challenging situation.

When I visited the Sixth Fleet about a year ago, the commander of the Sixth Fleet at that time told me that one of his biggest concerns was a wake-following torpedo against surface ships. And we have looked at that. We have some ideas.

We are investigating the technology. They are not very large programs at this time. The details are a little bit sensitive. But we think there is some chance that you could actually realize a weapon like this. It would be the underwater analogy to an anti-ballistic missile. You actually shoot the torpedo down, if you will.

Senator **Exon**. Let me follow that up, and since my time is up, Mr. Chairman, and I will be glad to yield then.

CRUISE MISSILES

As far as cruise missiles are concerned, in our strategic defense initiative program has there been anything that you know of that could possibly apply to an incoming cruise missile?

Is there coordination on that between SDI and the Navy? Is that a possibility?

Mr. **Moore**. Well, there certainly has been, Senator Exon, a lot of coordination on that. And I think the people in the Strategic Defense Initiative Office have looked at ways to apply the technologies from SDI in other areas, and especially in ADI, the air defense initiative, which you can think of as a companion program.

From my point of view, there is some of it that applies, but not a lot of it that is directly applicable. But that problem specifically, the cruise missile problem—and as I mentioned in my summary, I believe that submarine-launched cruise missiles represent a threat that we need to worry about against the continental United States, and solutions to that problem are being developed in a technological sense within the air defense initiative and also within some of our programs at DARPA.

Senator **Exon**. Thank you.

Thank you, Mr. Chairman.

NEW TECHNOLOGIES BY DARPA

Senator **Kennedy**. Admiral Cooper, could you tell us a little bit about what the Navy has done, what steps it has taken, how it has organized itself to try and take advantage of some of the new technologies that are being developed by the DARPA and by the Navy itself?

What currently is the situation and how has it changed?

Admiral **Cooper**. Yes, sir. The primary thing that we have done is in the last year we have established an office over the Naval Sea Systems Command under Admiral Tom Evans, who is behind me right here. He has established good contact almost on a daily basis with the people at DARPA, and the people in industry, at the various laboratories and the universities, to ensure we understand what is going on in any technology that could eventually bear fruition and be able to be used on the submarines.

Admiral Evans' organization has been manned and set up so that it can in working with DARPA identify when the various DARPA items are ready to come into the Navy and subsequently establish a plan to use and test the DARPA project within the Navy.

So Admiral Evans has been set up as our submarine research and development focal point. He has worked very closely with DARPA. I am extremely pleased with how that has gone.

If you would like some more information on it, I would be glad to have Admiral Evans discuss it.

Senator **Kennedy**. Admiral, do you want to just make a statement on this?

Admiral **Evans**. Mr. Chairman, Mr. Moore and I are in very close contact and accord on the process of transition development. My office was established in August 1988 by the Secretary of the Navy, as recommended by the Chief of Naval Operations.

Since that time we have fully staffed my office to the 1989 desired levels, and I have been working for the last 7 months with DARPA.

Senator KENNEDY. How many people?

Admiral EVANS. I have nine permanent civilian personnel, all technical people with the exception of some support personnel. In addition to that, I have four Navy laboratory personnel with me on 1-year career development tours, who bring to bear the expertise of the lead Navy laboratories that deal in submarine and undersea technology.

In addition to myself, I have a captain, a Navy captain submarine officer, who is my deputy director. The established manning level has been approved by Commander, Naval Systems Command for this year. We will expand to 12 permanent civilian staff personnel in 1990, and that has been approved and is currently programmed by my command.

I have received outstanding support in my efforts to establish my office from all of the agencies within the Navy associated with submarine research and development, including the Office of Naval Technology, Vice Admiral McCarthy's office, the Director of Research, Test and Evaluation, and from DARPA itself.

I owe a great deal to Mr. Moore and his associates, Dr. Taylor and Captain Pelaez, for making the liaison effective and productive. We are very pleased with the progress, sir.

Senator KENNEDY. Are you still working on DARPA's ASW initiative and the Advanced Submarine Technology programs?

Admiral EVANS. Yes, sir. Mr. Moore and I are, and I will let him have an opportunity here to answer you as soon as I explain our position.

There are really two programs that we are dealing with here. The first is the ASW technology issue, and the second is advanced submarine technology. There are two programs funded in DARPA, ASW technology and the Submarine Technology Program, which is fully funded through the end of 1989.

I am responsible for the development of advanced submarine technology for the submarine platform, the total ship engineering question of injecting advanced technology into future designs for the submarine. And of course, the submarine is a multi-missioned war-fighting vehicle, particularly our attack submarines, in that we have an anti-submarine warfare role as well as a strike role.

So the ASW question is somewhat different from mine, because I am responsible for developing technology for the entire submarine to support all of its missions.

Mr. Moore.

Mr. MOORE. Mr. Chairman, let me just say from DARPA's point of view we have a very special and productive relationship with Admiral Evans and his team, and that is really very important.

One of the big questions that we frequently address in this program as well as other programs is, what is the benefit of the technology? It is not enough to pursue technology advances. We have to economize, we have to select the technologies that are going to make a big difference in the military capability of the submarine.

We depend on Admiral Evans and his team and other people in the Navy to help us with that issue. And it is going extremely well, and the Navy established Admiral Evans' office I think to a large extent based on the need to work with us, and I am just very pleased with that.

To get to your question about anti-submarine warfare, we take a very broad view of anti-submarine warfare and we look far into the future, and what we see is the need for a lot of new technology to be developed to deal with these quieter Soviet submarines.

Some of the equipment that we have now deployed are going to face a great challenge from these quiet submarines in the future. So we look at all platforms. We look at the submarine as being the key platform for ASW.

We are concerned with the future surveillance system and whether or not one can continue to maintain a worldwide capability or how to focus that in certain regions. We are concerned very much about the future threat from very quiet, non-nuclear diesel electric submarines in the Third World. That is a growing problem.

So we are concerned with all of that, and our program looks far into the future and lays out a broad effort in technology that we think addresses the problem across the board.

THIRD WORLD SUBMARINE BUILDERS

Senator KENNEDY. Who are building those submarines for the Third World now?

Mr. MOORE. Let me ask the Navy.

Admiral COOPER. The primary nations building Third World submarines are the Germans. The Swedish are building a submarine for the Australians right now. The Dutch have built some submarines with their company in Rotterdam. The British are also building diesels for potential export. And of course the Soviets have sold some to India and some to several countries in the Mediterranean.

ADVANCED TECHNOLOGY

Senator KENNEDY. Now let me just get on to this advanced technology. As I understand, in your report, Mr. Moore, you talked about the need for structural acoustics, the problem that direct understanding of low-frequency acoustical phenomenon is hampered by lack of necessary facilities to conduct high quality experimentation.

Is that something you are taking a look at, Admiral?

Admiral EVANS. Mr. Chairman, the work that DARPA is doing relates to the ability to test our new advanced systems and the range or instrumentation networks that would be required to deal with the testing of quieter submarines and advanced systems.

We are working very closely with DARPA on the requirements side as far as the Naval Sea Systems Command is concerned. In addition to that, Vice Admiral McCarthy's office, he is the Director of Research, Test, and Evaluation, is heavily involved in the assessment and the requirements process for that type of test facility technology.

I would suggest that we discuss this matter in closed session, sir, if you agree.

Senator KENNEDY. Okay.

Senator Exon.

ANTI-SUBMARINE MINES

Senator EXON. Thank you, Mr. Chairman.

Just one or two more questions that I would like to follow up on. Admiral, how effective is our current inventory of anti-submarine mines against future Soviet submarines? What improvements in mine numbers or quality are being explored at this particular time?

Admiral COOPER. I cannot discuss the capability of mines with you, Senator. The submarine mine inventory is quite low. We have the capability to carry some mines on board a submarine, but I am just not capable of addressing that right now, and I will get some answers over to you.

Senator EXON. You do not have anybody with you who could?

Admiral COOPER. I do not see anybody who is rushing to the floor.

Admiral EVANS. Admiral, may I speak to that? Let me speak to that, Senator Exon, if I may.

In my previous job in the Naval Sea Systems Command, I was the Director of Anti-Submarine Warfare Systems, and had the mine programs. The Advanced Sea Mine Program, which was the joint United States-United Kingdom program that we were working on, was canceled for budgetary reasons by both countries this past year.

The principal anti-submarine warfare offensive mine system is the Captor mine, the encapsulated torpedo mine system. That system is several years old in its baseline design, but there are potential upgrade programs which we could provide additional detail to you about from the program manager and the sponsor, the Assistant Chief of Naval Operations for Surface Warfare.

But essentially, the program contains this year and beyond a small amount of research and development work for planned program improvement for the Captor mine system, and there are several ideas that are being pursued, as I understand it, in that area.

We can pass that to the appropriate people and get some additional information for you, sir, if you desire.

Senator EXON. I would appreciate it very much.

[The information follows:]

Soviet programs in acoustic quieting, magnetic signature reduction, and shock hardening have necessitated improvements to our existing operational mines. There are programs, underway and planned, for improvements to all our mines. The present Captor is effective today against most targets, and programmed improvements should extend its effectiveness into the twenty-first century. Quickstrike effectiveness is also projected into the next century with programmed improvements in target detection devices.

Senator EXON. I mean, for many years we have talked about this problem and I have gotten the impression—maybe I am wrong—that, if we have one potential weakness it is that we have not done enough in this particular area.

Do you generally agree with my concerns or am I taking too dim a view of what we have as far as mines to protect us from the Soviet subs should we become involved in hostilities?

Admiral COOPER. I do not think—I think your view is correct. Unfortunately, the problem that we get into, of course, is as we look across the spectrum of what we think we need and then we get into the budgetary crunch that we are in in trying to determine what priorities, and that sometimes leads us to what in isolation looks like dumb decisions.

But I certainly think it is a vulnerability, yes, sir.

Senator EXON. You would not mind taking some money out of SDI to put into that, would you, Admiral?

Admiral COOPER. I would rather talk about Navy subjects, sir.

Senator EXON. I thought so. I was not sure I would entice you into an answer in that. I think I know what your answer would be, so I do not need it for the record.

QUIETING SOVIET SUBMARINES

The matter of the quieting of the Soviet subs has been talked about a great deal today and I think that is a very legitimate concern. Whatever the percentage of improvement that has been made in Soviet submarines as far as quieting is concerned, we know that they are substantial.

In the view of your experts, for whatever improvement they have made—let us say they have made a 100 percent improvement as opposed to 5 years ago—what percentage of that improvement is in your opinion based upon their own technology, and what percentage of that improvement of 100 percent is based upon illegal sales of our technology and other quieting technology that should not have fallen into their hands, but they did buy it?

And second, what percent, if any of that, is due to the spying techniques that they have had, including the *Walker* case?

Admiral COOPER. I would think that probably the intelligence people could give you a better estimate. However, I think, with the tenacity that the Soviets have shown in looking at everything, we do not know what advances they are looking at, what technologies they are even looking at, until suddenly it appears, because of their capability to keep from publicizing it.

My opinion is that probably a large majority of the technical improvement they have made are based on their own technical expertise. The Soviets have known what the problem is, and I think through the *Walker-Wentworth* case they found that there were certain vulnerabilities that they had and so they have concentrated on those vulnerabilities.

I think the knowledge of how to overcome them has been from their own degree of intently looking at it and trying to develop solutions. I think they have certainly gotten something from the *Konigsberg* case and others, but I just cannot feel down deep that in fact they have not done a lot of it on their own.

Senator EXON. Well, that is what I kind of suspected, and I think that has to be a major concern of ours. If they steal or buy something, that is one thing. But it is even more potentially serious, it seems to me, if they have and are developing the know-how on their own.

That has to be a concern because that is likely to launch them into more success in the future, I assume. Is that your feeling also?

Admiral COOPER. Yes, sir, essentially that is correct.

Still, I would re-emphasize, however, I think we have a vast lead right now.

Senator EXON. I agree.

NUCLEAR SUBMARINE BASES

My last question, Mr. Chairman, has to do with the availability of bases for our nuclear submarines in the Pacific, given the nuclear-free zones that we are running into in the Pacific. If hostilities would break out in the Pacific, are you satisfied with the bases that we now have? Could they adequately support our nuclear sub operations in the Pacific?

Or are we handicapped, seriously handicapped, with some of the prohibitions that we are now running into?

Admiral COOPER. I do not think that we are seriously handicapped. I think that the bases that we have are competent to address whatever problems we have. A key advantage of submarines is you do not need a great deal of support. They are mobile. You send them out, they support themselves. Submarines can stay out for 3-plus months before they come back in.

So I think that, given that, I am certainly satisfied right now with the amount of support we have in the Pacific.

Senator EXON. Thank you. Thank you very much.

Thank you, Mr. Chairman.

SURFACE SHIP SPEED

Senator KENNEDY. Finally, Admiral Cooper, you are distinguished as a mariner, with many years of operational experience. And I am interested in your views on what effects surface ship speed has on safety from Soviet attack.

It is my understanding this has something to do with limiting the lines of approach. Are not the fast ships tougher targets?

Admiral COOPER. Yes, of course, they can be. The fact is, however, we have a torpedo that is faster than their ships. We have a submarine that is very fast and can get in a position to attack the submarine, attack the surface ship.

We also have the TASM or are in the process of getting the antiship missile with its range. So I do not feel that the fact that they have faster surface ships today than they might have a while back makes the problem any more complicated than the relative merits of the ships 20 years ago.

I think, given the whole thing, I think we are in a much better position, because now we have a nuclear Navy that can go around fast, as it has to. We have a fire control system that can determine where the ship is and where it will be going, and we can move fast enough to get there to take care of it.

This does not seem to me to be a real major problem.

Senator KENNEDY. Well, does that apply to ships, surface ships going 40, 45 knots?

Admiral COOPER. As far as a torpedo, the use of our torpedo or the anti-ship missile, yes, it certainly does.

Senator KENNEDY. Well, does it not complicate, the speed? Does that not complicate the whole firing process and procedures?

Admiral COOPER. Yes, it does, absolutely. But once you make the fire control solution, what may complicate it more is if he zigs a lot. On the other hand, once you determine the pattern in which he is doing that, again you can shoot.

We also, remember, have wire-guided torpedoes now. It is not a matter of shooting a torpedo and then it is sort of on its own. We have a wire-guided torpedo, and we are working on fiber optics so it can have an even longer range.

So with the higher speed of the torpedo and the wire guidance, then you should be able to take account of whatever zigs or whatever maneuvering he is doing.

Senator **Kennedy**. Okay. We want to thank all of you. It has been very helpful to the committee. We got a good deal of information, and we want to express our appreciation to all the witnesses and all your associates for joining with us today.

The committee stands in recess.

[Whereupon, at 5:06 p.m., the subcommittee was recessed.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

TUESDAY, MAY 2, 1989

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

NAVY'S FUTURE SURFACE FORCES

The subcommittee met, in open session, pursuant to notice, at 8:30 a.m., in room SR-232A, Russell Senate Office Building, Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Dixon, Warner, Cohen, McCain, Gorton, and Lott.

Professional staff member present: Norman G. Mosher.

Minority staff member present: Mark B. Robinson.

Staff assistant present: Lori M. Jackson.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Jeffrey B. Subko, assistant to Senator Exon; Charles C. Smith, assistant to Senator Dixon; Terrence M. Lynch, assistant to Senator Shelby; Dale F. Gerry, assistant to Senator Cohen; Robert M. Soofer, assistant to Senator Gorton; and Charles Pearcy, assistant to Senator Lott.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. We will come to order. I would like to welcome our witnesses to this morning's hearing. Today we will review plans for the development of the Navy's future surface forces. These plans are based on two recent studies, the Ship Operational Characteristic Study and the Surface Combatant Force Requirement Study.

These two studies have been combined into an integrated technology plan called the Revolution at Sea. Naval technology normally evolves slowly. But from time to time, new technologies offer opportunity for more rapid advances. Creative leadership recognizes these opportunities and plans accordingly. Adm. Arleigh Burke did that. He was a destroyer commander who became Chief of Naval Operations and guided the dramatic era of progress in submarine technology.

We will learn this morning that the time may be right for another major advance in naval technology. The plan before us is proof that our focus is on the future and that we are asking the right questions. Where do we want to be? And how do we get there? The plan also demonstrates confidence in our ability to manage the development and pace of technology to achieve the goals we seek.

Not many years ago, surface ships were built large and empty, in the anticipation that the technology would be found to fill them up. This approach is no longer acceptable. We must anticipate and plan for new developments. The plan also provides a useful bridge for the future in these times of defense budget reductions.

We need a strategy to protect the core elements of our defense from unwise budget cuts. The two most important elements to protect are the quality of our technology and the quality of our people. At the same time, technology in the laboratory has little deterrent effect. As the Revolution of Sea plan is considered this morning, we must assess the importance of supporting such a plan, both in terms of sound strategy and in terms of maintaining our comparative advantage in technology.

We are indeed fortunate to have with us this morning Vice Adm. John Nyquist, the Assistant Chief of Naval Operation for Surface Warfare. Also, we welcome this morning Capt. Clark Graham, Director of the David Taylor Ship Research and Development Center at Carderock Maryland. Admiral Nyquist we will start with you, if you would, please.

STATEMENT OF VICE ADM. JOHN W. NYQUIST, USN, ASSISTANT CHIEF OF NAVAL OPERATIONS (SURFACE WARFARE) (OP-03)

Admiral NYQUIST. Good morning, Mr. Chairman. The Revolution at Sea is three pieces of a larger puzzle that we are bringing together. The top-most, as you mentioned, is the Surface Combatant Force Requirement Study which says how many and what capabilities should our surface ships have. The Ships' Operational Characteristic Study on the bottom, off the fleet end to say what kind of ships, if we could start with a clean sheet of paper, would we like to have in the 21st century.

In the middle is Revolution at Sea 2020. That is the group of people and the determination and the study that we have put together to bring this technology together in our battle force combatant of the 21st century. Capt. Corky Graham, who is the Commander of the David Taylor Research Center, is here and will talk about the technology of that feature as we continue. Rear Adm. Nick Gee will follow him and, while we were in the midst of a revolution, we are always evolving our combat capabilities and we will talk about what we have in the immediate future.

Ship Operational Characteristic Study, Mr. Chairman, was a study in which we said look, let's bring in the naval officers, let's sit them down with a clean sheet of paper and say what would you want to have in your ship of the 21st century? These naval officers were both from here, in the fleet, and the technic commander and fleet commander staff. And they used the DDG-51, the *Arleigh*

Burke, as the baseline ship from which to foment the revolution, if you will. And I appreciate your mentioning Adm. Arleigh Burke.

Mr. Chairman, we saw him a week or so ago, when we dedicated a building in his name in Newport, RI. His ship is coming together.

Senator KENNEDY. Are they holding to the launch dates in Bath, ME in September?

Admiral NYQUIST. Yes, it is holding on the 16th of September. We would be delighted and honored if you could come—and certainly—Senator Cohen, I just mentioned——

Senator KENNEDY. I think I will commit for Senator Cohen. A launching up in Maine.

Senator COHEN. An aircraft carrier?

Senator KENNEDY. Do you want to hold it, Admiral? We were just getting started. Would you continue?

Admiral NYQUIST. What this study concentrated on was ordnance on target. That is the purpose, the raison d'etre of the surface combatant. That is what our people looked at. If you are going to bring a capability aboard, you are going to bring it aboard in competition with ordnance. That is, you had to prove that you needed to bring on something besides ordnance to get your way onto that ship. We wanted to look at what we could do to reduce manning and to expand the war-fighting volume of the ship.

What we wound up with after about a year of working on this study, Mr. Chairman, taking it to the fleet commanders and chiefs and their staffs, and bringing it back from the water front, were 12 what we call imperatives. These 12 characteristics, we believe, are essential to put in the ship of the 21st century. And we listed them in broad priorities.

Now, I would like to just highlight a couple of them, Mr. Chairman, to give you a flavor. In the Priority A we talked about cooperative engagement. And what that says is, if my ship has a target, but I do not have any missiles left and your ship has got plenty of missiles, but does not hold a target. This gives us the capability to combine those two capabilities and limitations to put ordnance on target.

Integrated machinery, that is what Corky Graham is going to talk about. That is, electric drive and all the other things that we can put into a ship to get us away from the old tyranny of the drive train, from boiler down to propeller at the end of this ship. And Clark Graham will go into that.

Survivability and the ability to fight hurt—not only do we want a ship that survives as a unit and protects its people, but we want that ship to be able to fight when it has been damaged. And we put a great effort into the DDG–51, the *Arleigh Burke.* That is the baseline from which we are going to grow.

The Priority B, let me just mention, for example, condition-based maintenance. What we want to do in this area is to build machinery that tells you when it needs to be fixed. We believe that we spend a lot of time today in our preventive maintenance, doing things that we perhaps, do not need to do. It is similar to today's car which you can drive 10,000 or 12,000 miles without an oil change, compared to what we did in the past.

But what it does is it recognizes that we made great advances in our machinery systems. They are built to run for a long period of time and we want to take advantage of that. That also saves on people.

In Priority C for example, the co-location of ship control and CIC. This has gotten a lot of interesting press. That is, to take the bridge and combine it with a combat information center, where the captain spends the majority of his time, fighting a ship, leaving enough room on the bridge for safety at sea and those evolutions. But there is a tremendous volume that we waste by having large expansive bridges when the real fight is down below where you have the information available to you.

Priority D, smooth topsides. For example, in the DDG–51 we are making great strides in reducing the rate of cross-section of that ship. This characteristic will go beyond what the DDG–51 can do today and give us ships that are much more difficult to detect.

I would just mention new information management. What that means is lets get paperwork off this fighting machine. On an FFG–7 alone, we have nearly 20 tons of paper. Some of it may be necessary, but we believe that we can get along with the rest of the world out there, start putting things on disks so that you could read them and use them when you need to. Next slide please.

This is a manpower slide, Mr. Chairman. And this axis is 100 percent manning on the DDG–51, today, for example, that is 289 sailors, that represents. Now, the imperatives that I have gone through each contributes in its own way in reducing the manpower acquired on that ship. And, intuitively, if we can execute these imperatives that we talked about, we can reduce the manning on the battle force combatant of the 21st century by a third. That is, a DDG–like ship of the 21st century, would have fewer than 200 sailors aboard.

So those are the kinds of pay-offs we see as we continue to develop this concept.

What is the impact on ordnance-related volume? Again, we have just under 20 percent of the DDG–51 devoted to ordnance, 20 percent. Invoking these imperatives of the Ships' Operational Characteristics Study, we can raise that percentage to 36 percent. In other words, we are almost able to double the amount of ordnance we can put on that ship. And that is clearly important, given the fact that we have—we are reducing our overseas basings, so the more ordnance you can put on that ship, the better off you are and the more capable it would be over the long haul.

That is what we call SOCS, the Ship Operational Characteristic Segment. Mr. Chairman, now I would like to talk about the Surface Combatant Force Requirement Study which said how many ships and what are their capabilities? That is, the general capabilities. What should they have?

We wanted to determine for the year 2010, in which this study is focused, what kind of ship we would need to meet a threat, and how many we would need? Let me give you the bottom line first. The capability of those ships is key. We need 224 multimission-capable ships as a minimum goal. We needed to build those ships at the rate of five to six a year as the minimum objectives, and then we have to implement a scheme called flexible transition, which I will get to in a moment.

We took 18 months to run this study. It started in November 1986. Our Center for Naval Analysis was a prime contributor, but in their view, this is one of the best studies of force requirements that has been done in their memory.

What the study concluded, Mr. Chairman, is there are two kinds of ships we would need, battle force combatants which steam with the battle groups——

Senator KENNEDY. Just doing quick math on there, you have 224 ships that you need, you do five a year, that would be 45 years of phasing these new ones in. I know you have to balance that against the retirement. Maybe we will come back to that in the questions.

Admiral NYQUIST. Yes, sir. And that is not starting from zero. We are starting from a base of ships now. We believe that five to six ships per year, we will get to where we want to be about 2010. By that time we will have 120 multi-mission battle force combatants to support carrier battle groups and surface action groups in the high threat environment.

Senator COHEN. Wouldn't that be reduced now that you are going to have 14 carrier battle groups?

Admiral NYQUIST. No, sir, Senator. First of all, we don't have the required numbers of battle force combatants now, and second, our analysis shows that if you reduce the numbers of CU's, you actually need more of these capable surface combatants to meet the threat resulting from fewer CV force levels.

Protection of shipping ships. This is what we used to call the frigate, that is, those ships which are primarily ASW ships and steamed with our convoys, our underway replenishment groups, and our amphibious forces, for a total of 224. It is interesting, the old—the early—1980s requirement was for 238 ships, based on the requirements and the threat that those ships were going to face.

If we were to continue to build that ship based on the old requirement, we would be more than 400 instead of 224 to take on the threat. My point there is that, capability of those ships is the key to taking on that threat of 20 percent.

Senator KENNEDY. But the numbers that you have now are tied into what your future project is in terms of savings, they follow that flow line. Is that correct?

Admiral NYQUIST. Yes, sir.

Senator KENNEDY. I mean you have—you estimate how you are going to make those more effective and I imagine that is programmed into your own assessment in terms of the total need.

Admiral NYQUIST. Yes, sir. The capabilities and characteristics of those ships are what I described and that is the ship of the late 20th and 21st century.

Senator COHEN. You are factoring in the enhanced capability of fewer numbers of ships. Are you also factoring in the enhanced capability of the Soviet threat in terms of advances that they are making in their surface and submarine capability?

Admiral NYQUIST. Yes, sir, Senator Cohen. The bedrock of this study with our intelligence estimates and that our Director of Naval Intelligence gave us of the threat that the ships would face in the year 2010, as best we could predict.

Flexible transition is a concept that says that when a ship is first built, it is effective against the threat. We build to the threat.

Therefore, on commissioning we would say that the ship that is commissioned on that day is fully capable against the threat. As time goes on, and a threat evolves, then the ship becomes less capable against the threat. Now, what we do in flexible transition, we say, a battle force combatant is going to have a service life of 40 years. And when you get to the midpoint of that service life, at the 20-year point, we say we are going to shift your role and the battle group role to the protection of shipping role.

So, rather than building a number of ship classes to meet particular threats throughout the spectrum of threats, we want to build our ships capable against the most stringent threat and then let those ships' capabilities as time evolves to grey gracefully, if you will. But at the midpoint of their service life, now they shift into these roles, convoy protection, underway replenishment group protection and marine expeditionary force protection.

SLEP PROGRAM

Senator COHEN. What happens to the SLEP program?

Admiral NYQUIST. The SLEP program, Senator Cohen, as a service life extension program applies to the carriers, I think we will—for those applicable ships, we will always have a program to take care of those larger ships. Now I am talking about the surface combatants, the destroyers that we have now and we are going to build.

Now, what we have done in the past, of course, and what we are going to have to do for clearly the remainder of the century and into the 21st century is continue a modernization program. Again, I emphasize that this is looking ahead to the 21st century. So, we will still have modernization programs ongoing as we do right now with the Spruance class destroyer and looking at our frigate modernization programs.

So, we will continue to do that, but the goal is you get to a point where we are building very few classes of surface combatants. One, if you will, or versions of one, so that what we wind up with and if you will go to the next slide, we wind up with a steady state construction plan that is building very few classes perhaps just one class of ship. We will reduce our cost to eliminate block obsolescence.

We will increase ship availability. We will be able to put a technology into those ships. What we will get away from is building, training, maintaining, repairing a large number of classes of ships that we have today.

Senator KENNEDY. What are you giving up by reducing the types of surface ships you are talking about?

Admiral NYQUIST. We do not think we are giving up anything, Mr. Chairman. We think we are growing. Number one, we are producing a ship we believe that meets the threat.

Senator COHEN. Is that the destroyer or cruiser?

Admiral NYQUIST. Well, that is an interesting comment, Senator. What we are calling it is a battle force combatant, so the distinction between cruiser and destroyer is beginning to blur. For example, after we get through building the first 29 *Arleigh Burke*-class ships to replace the DDG-2 and DDG-37 class ships, those built beyond that will start to replace cruisers, the CG-16 and 26 class.

So we see ahead, at least for now, one generic class of battle force combatant. That is, the ship that can steam with battle group and take care of all of the roles and missions that we have in the past held for cruisers and destroyers.

Senator COHEN. Will it look more like a cruiser or more like a destroyer?

Admiral NYQUIST. If you look back in time a little bit, if you look back in time, it would probably be closer to what we would call a cruiser. That is, it is going to be a bigger, tougher ship. But I would say if you look at the *Los Angeles* class cruiser of some 20,000 to 26,000 tons, I would not see it being that big. But if you compare it say, to the DDG-51 today of 8,300 tons, yes, it will grow beyond that in the future.

Senator KENNEDY. There is a natural, I suppose, correlation that you are going to greater efficiencies at the ship yards, greater savings, multiyear funding, and developing the capability of production of these. I am not sure that is reflected or if it reflected in the earlier buys. Now that they are talking about—the administration is talking about—five a year for 3 or 4 years.

As I understand it, that economy of reduction is not quite going to be realized yet.

Admiral NYQUIST. We think that the estimates——

Senator KENNEDY. I guess the estimate is 10 percent—are you not supposed to get 10 percent for multiyear funding? Is that realistic? I guess it becomes just a little lower.

Admiral NYQUIST. It does become just a little lower. Over the length of time we are looking at, the numbers that I see—and this is more Mr. Pyatt's area of expertise than mine—is close to $650 million. But even if that does not quite meet the 10 percent rule, it certainly is substantial savings. So we believe we see substantial savings in that an approach.

Again, the benefits of flexible transition, Mr. Chairman, are standardization, reducing manpower certainly as we bring the manpower of those surface combatants down, simplify training, spare parts maintenance. We believe it is the way of the future.

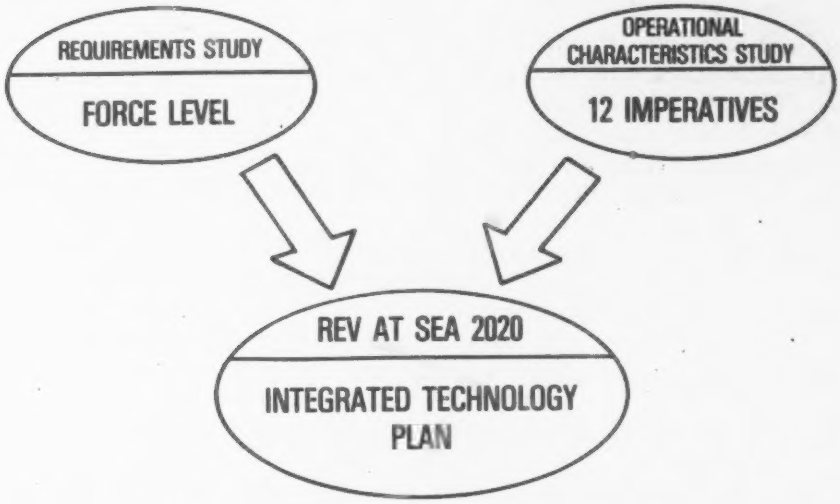
I again would caution, though, sir, as you have pointed out, that this is not something that is going to happen today or tomorrow. It is the view ahead.

To continue that view ahead, I would like now to introduce Capt. Corky Graham who will talk about what he is doing out at Carderock.

STATEMENT OF CAPT. CLARK GRAHAM, COMMANDER, DAVID TAYLOR RESEARCH CENTER, U.S. NAVY

Captain GRAHAM. Mr. Chairman, members of the subcommittee, as the Commander of a major Navy laboratory, my job is to create the technological vision of the future Navy and then to develop an intergrated plan to transform that vision to reality.

REVOLUTION AT SEA 2020



REQUIREMENTS STUDY

FORCE LEVEL

OPERATIONAL CHARACTERISTICS STUDY

12 IMPERATIVES

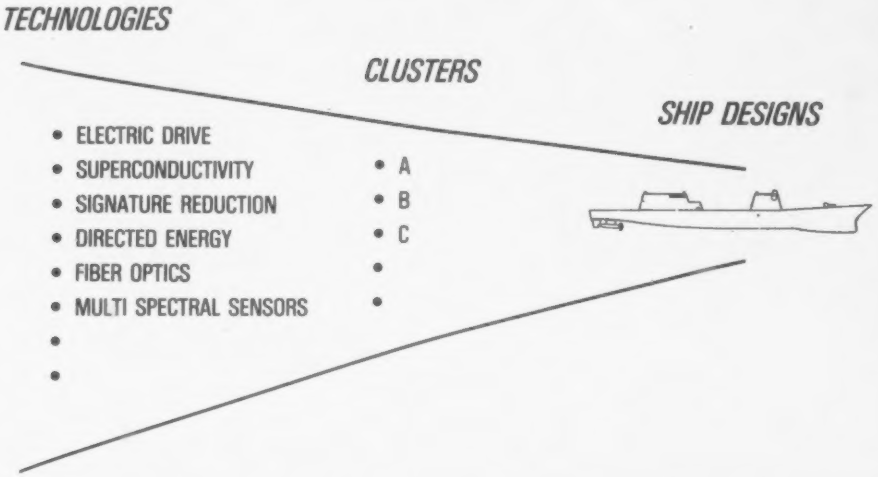
REV AT SEA 2020

INTEGRATED TECHNOLOGY PLAN

Admiral Nyquist articulated what has been arrived at and what has been determined in the requirements study and the operational characteristics study. We will take the output of those two endeavors and create the Revolution at Sea 2020 Study. This will be integrated into a technology plan to determine what technological foundations we need to invest in now for the Navy of 2020 and beyond.

The next chart.

REVOLUTION AT SEA 2020



TECHNOLOGIES

CLUSTERS

SHIP DESIGNS

- ELECTRIC DRIVE
- SUPERCONDUCTIVITY
- SIGNATURE REDUCTION
- DIRECTED ENERGY
- FIBER OPTICS
- MULTI SPECTRAL SENSORS
-
-

- A
- B
- C
-
-

What I would like to do is to first discuss our thought process and then to introduce you to one of the key technologies that we have already committed to, namely, integrated electric drive.

In this study, we will begin to conceptualize ship designs that we will introduce into the Navy in the year 2020 and beyond. Then we will identify the clusters of technologies, the synergistic groupings of technologies, that we must invest in now that will form building blocks for these ship designs. These clusters of technologies will consist of synergistic combinations of the most important technologies such as electric drive, directed energy, fiber optics, et cetera.

The next chart.

REVOLUTION AT SEA 2020

TECHNOLOGIES

REQUIREMENTS

ASSESSMENT

INTEGRATED PLAN

Now, here is the thought process of this study. Our technology plan must be driven by requirements. We have one team that is establishing quantitative, time-phased operational and affordability goals. We are determining where we have to be in capability and affordability in the out-years.

The second team then identifies the synergistic combinations of technologies, or what we are calling clusters of technologies that will allow us to reach those goals.

We have to ask a fundamental question. Can we get to the goals without investing in this technology? If the answer is no, then that becomes a compelling justification for investing in that technology today. That question is essential to the fundamental thought process.

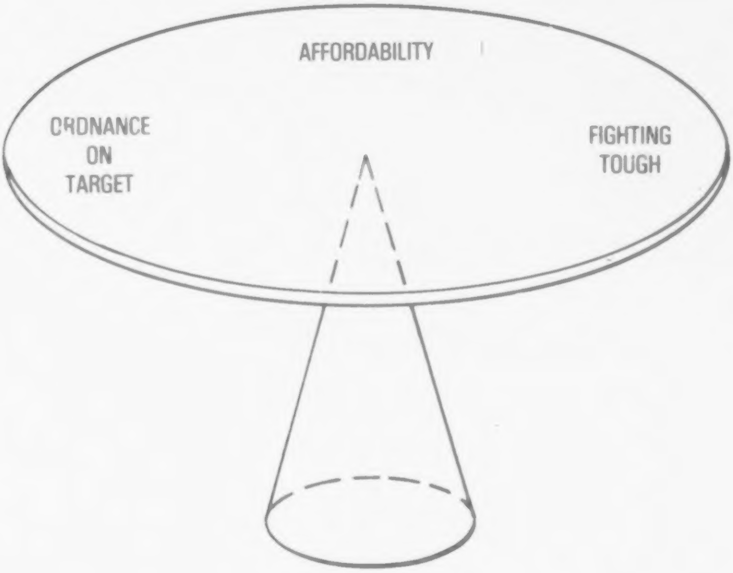
Those questions will be asked and the questions will be answered by an independent assessment team that is pursuing military effectiveness versus affordability tradeoffs. All this information will culminate in an integrated technology plan.

Senator Cohen. Who decides what the goal is going to be? It seems to me if you formulate the proposition that we want to get over here by 2020, we cannot get here unless we have the following. Who formulates and decides upon the 2020 goal?

Captain Graham. The requirements team of the Revolution at Sea 2020 studies sets these goals building on the requirements study that Admiral Nyquist presented, which specified the force requirements. We then have to determine what should be the operational capability of those future ships. We also must establish what should be the affordability constraints that we ought to be planning on.

Based on military effectiveness analysis, based on the projection of the threat, we predict how capable our ships must be in 2020 and beyond. Then we set those goals today, and then we invest in technologies that will allow us to achieve those goals.

MAJOR CONSIDERATIONS

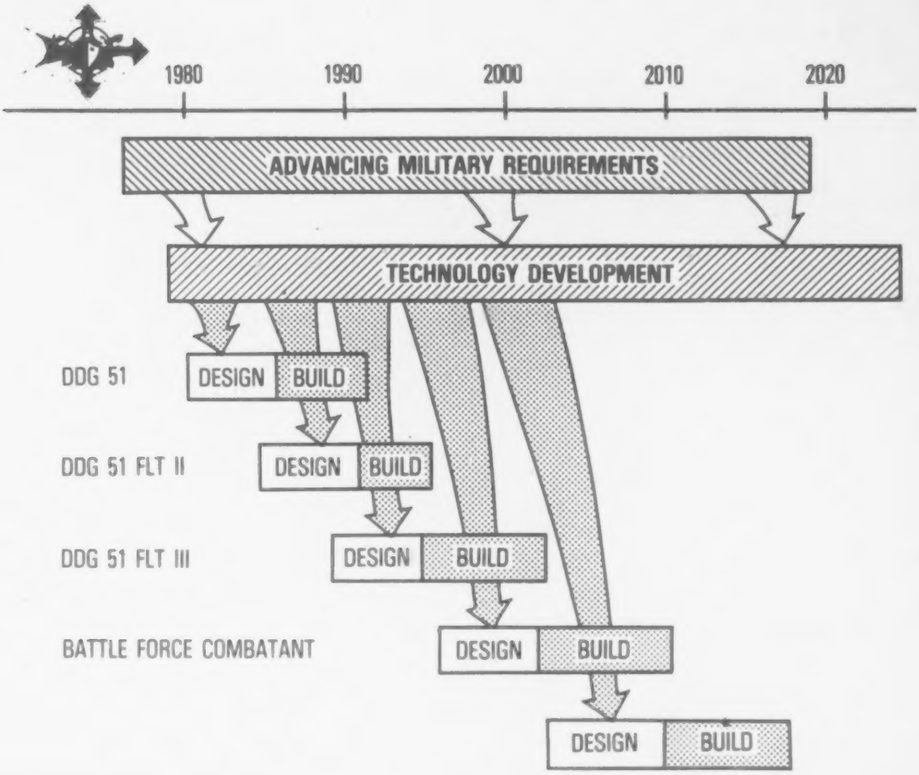


The major considerations that will be driving us in setting goals will be placed in three categories.

The first are goals that will allow us to put ordnance on target. As Admiral Nyquist pointed out, that is the reason for the existence of the Navy.

The second major category is fighting tough. This includes signature reduction, passive protection and damage control, and sustainability of the ship itself.

Then we cannot forget affordability. We have to invest in technologies that will save procurement dollars and operating and support dollars in the future. We must approach our R&D investments as a businessman as well as military analysis people. Next chart.


1980
1990
2000
2010
2020
ADVANCING MILITARY REQUIREMENTS
TECHNOLOGY DEVELOPMENT
DDG 51
DESIGN
BUILD
DDG 51 FLT II
DESIGN
BUILD
DDG 51 FLT III
DESIGN
BUILD
BATTLE FORCE COMBATANT
DESIGN
BUILD
DESIGN
BUILD

In summary, what we are doing is; based on our projection of the threat, we are establishing the future requirements, establishing quantitative operational and affordability goals that will drive our decisions as to what technologies to invest in today, and then developing an integrated plan so those technologies are ready for infusion into these future shipbuilding programs. Next chart.

THE NAVY'S ELECTRIC DRIVE PROGRAM

"THE FOUNDATION FOR THE REVOLUTION"

Now, one such technology that we are very excited about, and have committed to, is integrated electric drive. We feel this is one of the technological foundations of the future surface Navy. Next chart.

"I AM DECLARING THAT INTEGRATED ELECTRIC DRIVE, WITH ITS ASSOCIATED CLUSTER OF TECHNOLOGIES, *WILL BE* THE METHOD OF PROPULSION FOR THE NEXT CLASS OF SURFACE BATTLE FORCE COMBATANTS, AND I AM DIRECTING ALL THE MAJOR NAVY ORGANIZATIONS INVOLVED IN THESE EFFORTS TO CONCENTRATE THEIR ENERGIES TOWARD THAT OBJECTIVE."

– ADM TROST
SEPT 1988

In September the CNO, Admiral Trost, made this rather bold pronouncement, "I am declaring that integrated electric drive, with its associated cluster of technology, will be the method of propulsion for the next class of surface battle-force combatant."

What I would now like to explain is what that cluster of technologies consists of with emphasis on electric drive. And then I will explain why the Navy made such a pronouncement this far in advance. Next chart.

CLUSTER "A"

7 SYNERGISTIC TECHNOLOGIES

- INTEGRATED ELECTRIC DRIVE (ELEC PROP. + PDSS)
- ADVANCED PROPULSOR SYSTEM
- ADVANCED ELECTRICAL DISTRIBUTION SYSTEM WITH PULSE POWER
- ICR GAS TURBINE

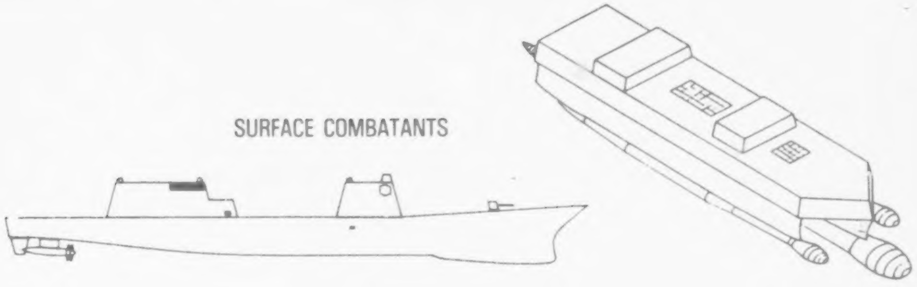
- ADVANCED MONITORING AND CONTROL SYSTEM
- ADVANCED AUXILIARY SYSTEM
- TAKE-HOME/LOITER POWER SYSTEM

Here is what we refer to as Cluster A, the first of these foundation clusters that we want to build our future Navy around. The pillar of this cluster is integrated electric drive, which is a combination of electric drive propulsion and something called propulsion derived ship service power. I will explain both of these.

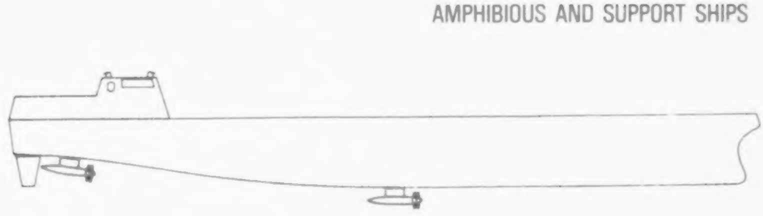
That is really the central foundation of this cluster because it enables additional technologies. It enables us to choose advanced propulsor systems. It enables us to couple the drive train with a very energy-efficient gas turbine engine to achieve substantial improvements in range, sustainability, and signature reduction. I will explain some of these synergisms as I go through this brief. Next chart.

THE BOLD STRATEGY

CONVERT SURFACE NAVY TO INTEGRATED ELECTRIC DRIVE


SURFACE COMBATANTS

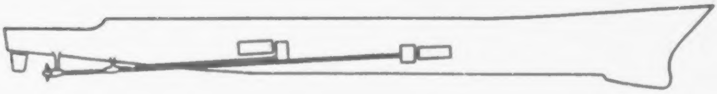
WHY THE CHANGE?


AMPHIBIOUS AND SUPPORT SHIPS

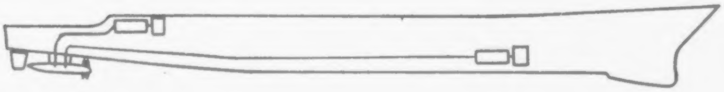
The bold strategy that we are laying out is to convert the surface Navy to an electric drive Navy. This vision includes our surface combatant ships, our amphibious and support ships. It would allow us to start looking at very unique hull forms such as the semisubmerged multi-hull form shown in this chart. Next chart.

WHY THE CHANGE?

TODAY: THE "TYRANNY" OF MECHANICAL DRIVE



FUTURE: THE FLEXIBILITY OF INTEGRATED ELECTRIC DRIVE



Now, why the change? The key answer to this is the word "flexibility." We want to enable flexibility in physical arrangement and flexibility in power management. This chart shows that today we suffer from the tyranny of the mechanical drive train. Today in a typical surface combatant we have a 280-foot mechanical drive train. That is the distance from the propeller to the prime mover. The prime mover has to be in a direct line with the propeller over that distance. Essentially, the Naval architect's hands are tied. The geometry of two-thirds of the ship is relatively fixed.

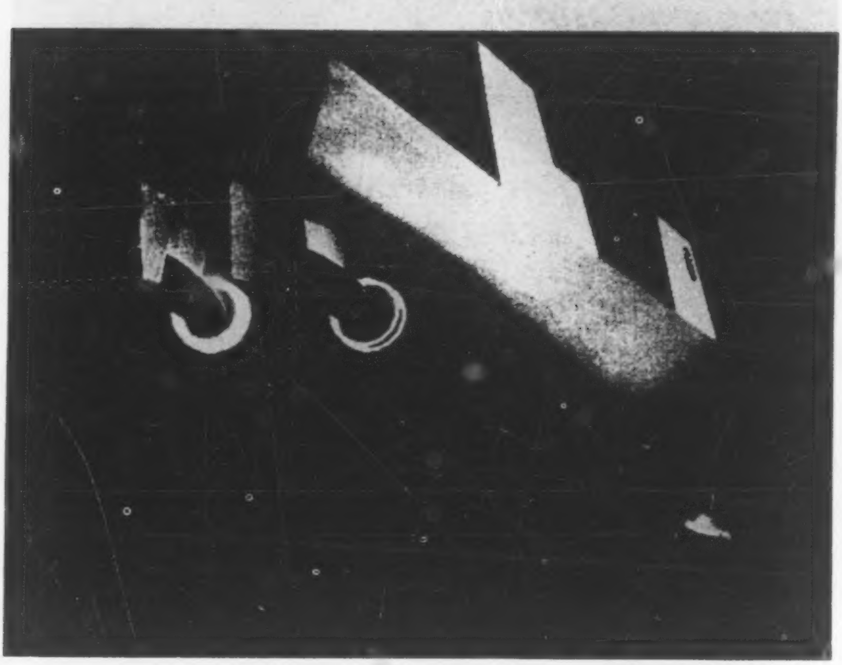
In the future, with electric drive we can decouple that long drive train and we can position the prime mover and the propulsor in any relative location that we would like. In this case, we show the prime mover and the propulsor back in the aft part of the ship. In the overlay, we show that we can situate an additional prime mover up in the forward section of the ship. That will allow us to increase survivability substantially.

In the old arrangement, if we take a hit anywhere over this 280 feet, the whole drive train is subject to being put out of action. In the flexibility arrangement, we can separate the prime movers, we can armor this electric transmission cable, we can locate it in the most inherently protected part of the ship, and achieve significant advantages in survivability.

Senator COHEN. Where you have one propulsor, what happens if you take a hit in the rear?

Captain GRAHAM. Well, we actually have two here, one port and one starboard. But we are exploring additional opportunities of putting propulsors up forward. We will definitely situate a take-home small propulsor below the forward engine to obviate exactly what you just pointed out. Next chart.

POD PROPULSION

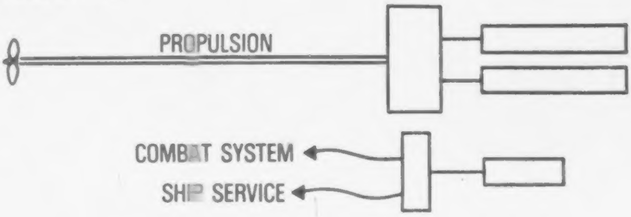


This is a fish-eyed view of one example of an advanced propulsor system that has been enabled by electric drive. In this case we situate the electric motor in a pod below the ship allowing us to have forward facing counter-rotating propellers. This provides us with "front-wheel drive"—very much like front-wheel drive on your automobile.

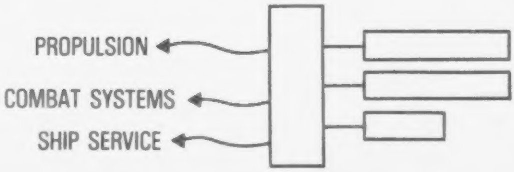
The advantage in this arrangement is that we have smooth hydrodynamic flow into the propeller. This will reduce the inception of cavitation which is a major source of acoustic energy. This geometric flexibility is really a ship designer's dream. The next chart.

WHY THE CHANGE?

TODAY: NON INTEGRATED



FUTURE: INTEGRATED



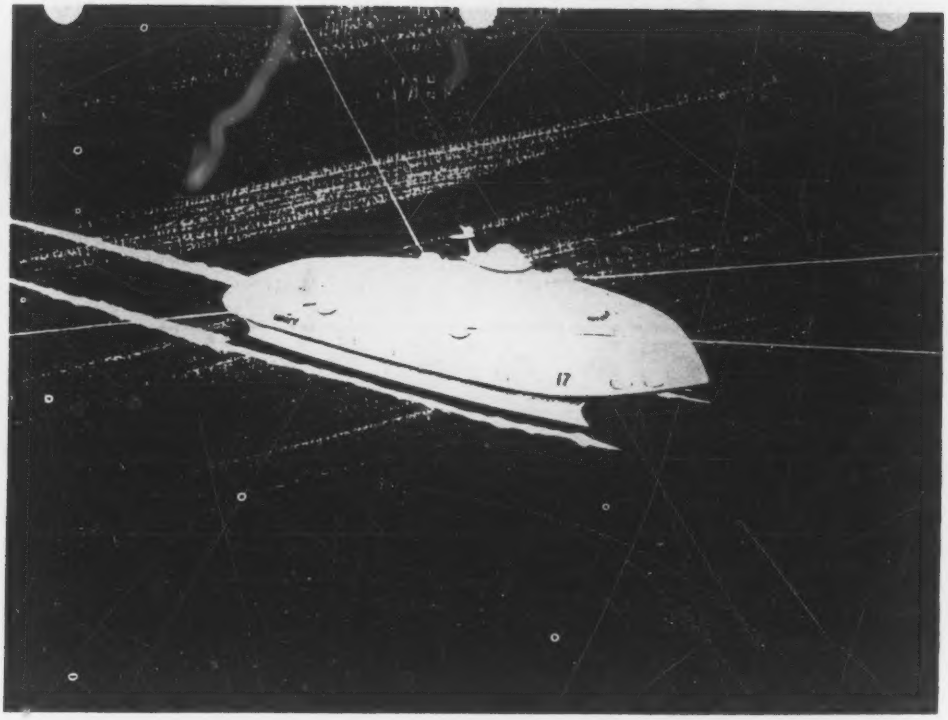
Now, the other area of flexibility is in power management. Today we have an unintegrated power plant. The propulsion plant is separated from the ship service electric plant. The power generated in the propulsion plant cannot be used for electrical purposes and vice versa.

In the future, all of the prime movers will generate electrical power. Then, with an advanced electrical distribution system we can power manage or distribute that power as the tactical situation dictates.

In some cases the science fiction of the past becomes the reality of the future. If any of you are "Star Trek" fans, you have insight into what we are striving for here. You can imagine Captain Kirk on the bridge of the star ship *Enterprise* calling down to his engineers, "Scotty, we have got to get out of here. Give me maximum speed, warp speed four." In that case, all of the power of the *Enterprise* would be put into the propulsion plant.

In another tactical situation Captain Kirk might turn to Sulu and say, "Rig maximum magnetic shield, activate high-powered phasers." In that case, most of the ship's power would be diverted to the offensive and defensive combat systems and protection systems.

We want to provide the foundation for the future Navy which will allow that degree of tactical flexibility to avail itself to the warrior at sea. Integrated electric drive will allow us to do that. Next chart.



Now, we like the idea of being able to ask the question, "What if?" What if we could provide up to 150 megawatts of power to the future combat systems? To put that number in perspective, today we only provide 1.5 megawatts to the Aegis combat system. So, that is a hundred times more power.

Right now we do not even know what we would do with that much power. It begins to open up opportunities in high-powered lasers, high-powered radars and sensors, electromagnetic guns, and electromagnetic armor. It opens up the chessboard. If we were master chess players, this is the first major chess move we would make to open up the chess board to enable us to develop all sorts of exciting technologies over the next 20 or 30 years.

I believe that is what Admiral Trost was driving at when he made the commitments to this integrated electric drive technology. The next chart.

CLUSTER "A" CONTRIBUTION TOWARDS GOALS

ORDNANCE ON TARGET

CAPACITY	POWER	FLEXIBILITY
●	●	●

AFFORDABILITY

ACQ	O&S
●	●

FIGHTING HURT

SIGNATURE						PASSIVE PROTECTION	
ACOUSTIC	RADAR	IR	WAKE	MAGNETIC	ELECTRO-OPTICAL	PROTECTION	DAMAGE CONTROL
●	◓	●	●	○	◓	◓	◓

SPEED	ENDURANCE	SEA-KEEPING	NORTH ATLANTIC OPERATIONS	MANEUVERING
◓	●	●	◓	○

AVAILABILITY	LOGISTICS
◓	●

● MAJOR CONTRIBUTION ◓ CONTRIBUTION ○ LITTLE CONTRIBUTION

If we worked for Consumer Reports, we would rate integrated electric drive best buy. The reason is because this technology contributes so significantly to so many of the goals that we have set. In the area of ordnance on target, we can put more combat systems on a given size ship because the overall machinery plant occupies far less volume and far less weight. As Admiral Nyquist says, we have to open up that volume for ordnance on target.

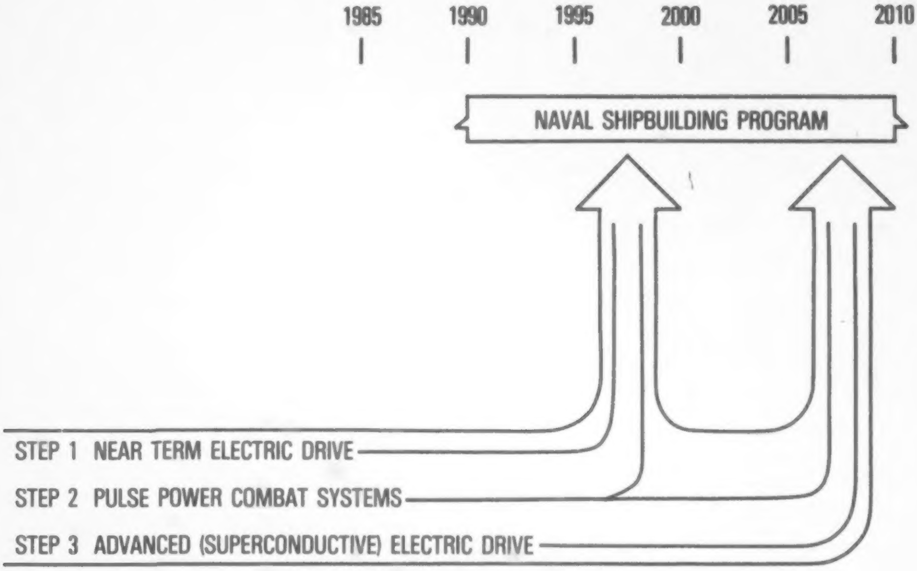
It provides much more electrical power to the combat systems, as I have described. And, the arrangement flexibility will allow us to situate the combat systems in inherently the most survivable part of the ship.

Our studies show that we can put the same combat capability on a smaller ship because of this electric plant. The approximate acquisition and operating and support cost savings are about 2 and 10 percent respectively. That is a fairly good first move toward increased affordability.

For the goals in the area of fighting hurt, this system will begin the revolution to the low observable surface Navy because we can exploit the flexibility in the physical geometry of the ship. That is what we need to make our ships more stealth-like.

I have already referred to the ship protection and damage control advantages caused by separating and situating prime movers over the length of the ship. Next chart.

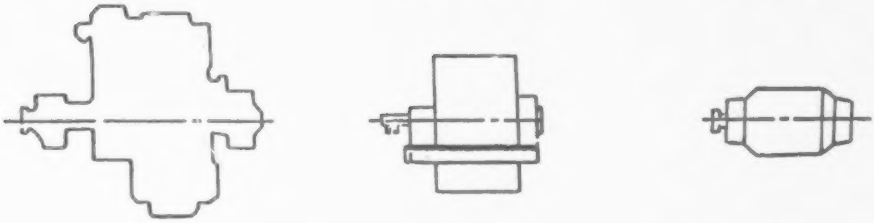
THREE STEPS IN NAVY ELECTRIC DRIVE PROGRAM


1985
1990
1995
2000
2005
2010
NAVAL SHIPBUILDING PROGRAM
STEP 1 NEAR TERM ELECTRIC DRIVE
STEP 2 PULSE POWER COMBAT SYSTEMS
STEP 3 ADVANCED (SUPERCONDUCTIVE) ELECTRIC DRIVE

Our electric drive program really has three steps. We are now committed to and are in the middle of the near term electric drive program. We want to start this transition to electric drive as soon as possible. In parallel, we are working on advanced superconductive technology. As we work on these two electric programs, we will also integrate in the high-power combat system developments as they begin to evolve. Next chart.

MOTOR COMPARISON

40,000HP, 180RPM



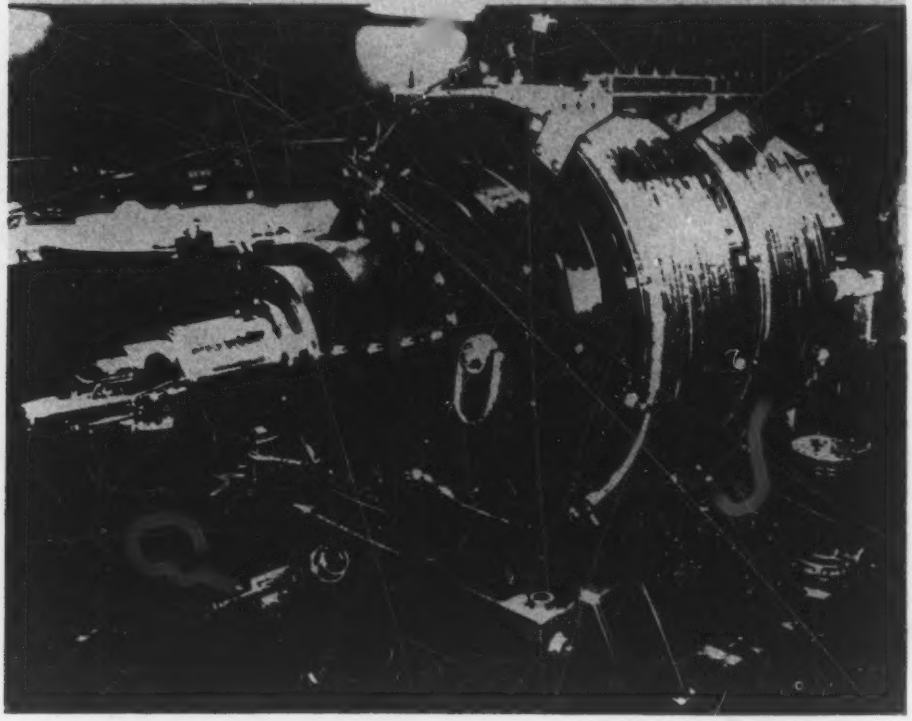
PAST	*NEAR TERM*	*FAR TERM*
AIR COOLED AC MOTOR	LIQUID COOLED AC MOTOR	SUPERCONDUCTIVE DC MOTOR
320,000 LB 20 FT DIAMETER	200,000 LB 14.5 FT DIAMETER	88,000 LB 6.5 FT DIAMETER

This chart illustrates the relative size advantages caused by these technologies. In the past, if we were to construct a 40,000 horsepower motor (and on a destroyer/cruiser type ship we would need two of these), that motor would fill up this room. It would be 20 feet in diameter.

With today's technology, which we are developing in the near-term program and which includes liquid cooled machinery, we can cut that 20-foot-diameter machine down to about 14 feet. The ultimate (what we are shooting for in superconducting program) is to be able to put 40,000 horsepower in a machine of about 6-foot diameter. That represents a tremendous improvement. That allows us to situate that electric motor in locations of the ship that, of course, you could not do with today's large motor.

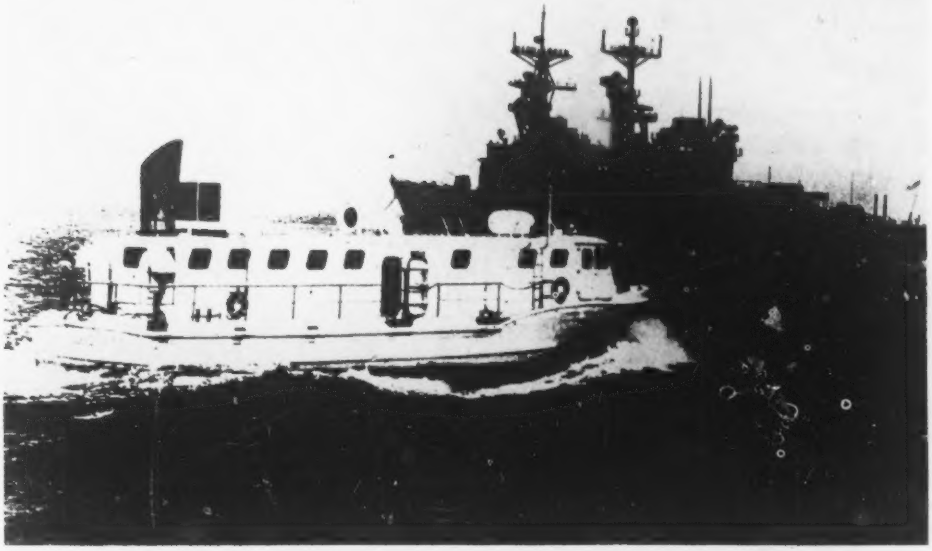
In the past, this would be the size of the electrical cable that would transmit this much electrical energy around the ship. And the superconducting cable, rated for that same electrical power, is transformed to a cable of this size. That is what superconducting technology can accomplish. Next chart.

3000 Kw SUPERCONDUCTIVE MOTOR



We have built superconducting machinery in the Navy. At the David Taylor Research Center, we have built a 400 horsepower system and a 3,000 Kw system. This is a picture of a 3,000 Kw machine that we built. We have tested this system at sea in a test craft. We have experience in the lower power levels with this technology. Next chart.

SUPERCONDUCTIVE TEST CRAFT



We actually took this system consisting of a super conducting generator, a superconducting motor, and a distributant control system, cut the land base umbilical cord and sent this to sea on this test craft. So, we know how to do this and we are ready now to take that technology to full scale to 40,000 horsepower. Next chart.

THE NAVY'S ELECTRIC DRIVE PROGRAM IS THE FOUNDATION FOR THE REVOLUTION AT SEA

I would like to conclude that the Chief of Naval Operations, Admiral Trost, made a brilliant initial chess move in committing to the first technological foundation of integrated electric drive. It will enable us to make many additional moves in the near and far future that we feel will become additional foundations of the future Navy.

We certainly look to you, Mr. Chairman and members of the subcommittee, for your support in this very important program over the next decade.

Thank you. I would like now to introduce Admiral Gee, who will continue the discussion on some of the technologies we are working on.

SCFRS and SOCS represent a major philosophical change in the way we do business.

We know what needs to be done.

We are solving near term problems while looking far into the future.

Your commitment has made this possible and we thank you for your continued support.

STATEMENT OF REAR ADM. GEORGE N. GEE, DIRECTOR, SURFACE COMBAT SYSTEMS DIVISION (OP-35), U.S. NAVY

Admiral **Gee**. Mr. Chairman and members of the subcommittee, I would like to bring us back from the 21st century back into the early 1990s and tell you that we are embarked right now on a myriad of technologies which are in fact revolutionizing the way that we do business at sea.

I am certainly not going to talk about all of them, but I would like to give you a snapshot for some of the big and the little programs and where we are headed right now, in the hopes of leaving you with a sense that we have a road map of where we are going in the 1990s.

These are our objectives. They are all good solid objectives. They range from expanding our battle space to making ourselves more survivable; reducing the manning on ships, and those types of things, with the principal interest in the 1990s of neutralizing the cruise missile torpedo threat to our surface ships.

As we look at all the technology available to us, the real challenge we have is making the most judicious use of the dollars we have and applying those to technologies which are most appropriate to get the war fighting job done. We have four cornerstones that we follow as we look at the world of technology available to us today.

The first is there has to be a war fighting benefit or an efficiency directly attributable to any technology which we pursue.

Second, we need to balance those investments in revolutionary technology, such as electric drive, with those which I would call evolutionary, the technologies we apply to today's weapons to make those weapons better. To evolve them, since that is a more efficient process.

Third, whatever technology we put into our ships, we have to integrate that technology with the combat systems and engineering systems on the ship. The day of going out and buying the gizmo because it is a neat gizmo by itself, but not having it integrated into the ship properly so that humans can employ it effectively is long gone.

Senator **Cohen**. What kind of gizmos have we been employing, Admiral?

Admiral **Gee**. We have not been buying, hopefully, Senator, any gizmo. There is always an enticement, however, from a variety of places for a box, a black box, or a machine, that standing alone by itself will do a little chunk of a job. When we invest in technology, that black box may be important to us but we also have to make the corresponding investment to have that fully integrated into the combat system. That is how we achieve efficiency and ordnance on target, reduce manpower, and reduce maintenance costs on a ship.

The fourth cornerstone is to keep it simple. That sounds perhaps a little strange this day and age with a lot of advanced technology and we hear a lot about advanced combat systems and machines such as Aegis. But by keeping it simple we mean simple to train on, simple to operate, and simple to maintain.

Right now the Aegis combat system is the most complex combat system in our conventional Navy. Yet, that system is demonstrating more reliability and less maintenance costs than anything comparable in the past. So, we are achieving that goal.

The final point I would like to make. Whatever technology we invest in, we have to have the ability to distribute it through the fleet. Merely reaching initial operational capability in a technology and not having the plan and resource to spread that across our ships does not buy us real fighting capability. Next slide, please.

NEUTRALIZED CRUISE MISSILE AND TORPEDO THREATS

Senator **COHEN**. Could you go back to that slide? When you say neutralized cruise missile and torpedo threats, does that mean eliminating nuclear tip cruise missiles by the Soviets and the United States?

Admiral **GEE**. That means giving ourselves, against the entire cruise missile and conventional torpedo threat, the ability to destroy that threat before it can destroy us. That is a matter, Senator, of covering a very large volume of battle space through layered defense in depth, both in anti-air warfare against cruise missiles and anti-submarine warfare.

Senator **COHEN**. I will come back to that later.

Admiral **GEE**. The nuclear tip cruise missile, we are not going to defeat within 2 or 3 nautical miles of the ship. What we have to do is to defeat the launch platforms so that that missile is never launched.

Senator **COHEN**. I was referring to an item that appeared in the Sunday Times that the Navy has embarked upon a plan to remove a number of its nuclear-capable missiles with a hope that the same might be achieved on the part of the Soviets. I am just wondering whether that neutralized cruise missile torpedo threat is broad enough to include that apparent strategy, if it is a strategy.

Admiral **GEE**. The Navy's removal of the ASROC and the Terrier BTN and the SUBROC, which are early 1960s weapons was based on the fact that they had reached their useful surface life.

Senator **COHEN**. Took up too much space?

Admiral **GEE**. Well, basically the weapons did not have war fighting value to us any longer.

One would pursue tactical nuclear weapons perhaps for about four reasons. Number one is the tactical nuclear deterrent. Number two, because we have a threat of such density that we cannot put enough fire power up with conventional weapons to manage that threat. Or, number three, we have a threat with such a characteristic that we cannot get close enough to it with our weapons to destroy it so we need a larger warhead.

Back in the 1960s that was the case in some instances. We now have the fire power volume in anti-air warfare and submarine warfare. We have the accuracy of our weapons so that we can achieve the same objective—okay—at this stage without relying on the older weapons developed in the 1960s.

Tactical nuclear weapons always have a drawback to those who are employing them because they change the environment in which we are fighting. Not only from a political point of view and a destructive point of view, but they do modify the environment. So, the Navy's decision to retire these weapons, as was written to some degree by Mike Gordon in the New York Times, was based solely on the fact that these older weapons had reached the end of their useful service life and we considered it a very low-risk practical move for the Navy to retire these weapons at this time. We still have other tactical nuclear weapons in inventory. Next slide, please.

There are lots of flavors of technology out there, and most of them that I have listed here we are pursuing right now. I am not going to go over any of these in great detail. Some of the things we do are very small but have a very, very large payoff. I would like to give you some examples.

Our phalanx close-in weapons system, which we are all familiar with, is the last-ditch gun system on our ships for cruise missile defense effective to out about three-quarters of a nautical mile. It uses a bullet that looks like this and it fires about 4,000 rounds per minute of these at a target. It controls these, so it puts 75 rounds per second in a 6-foot diameter circle. Deadly accurate.

This was originally constructed to penetrate around here, which penetrates the cruise missile and destroys it. It was originally constructed out of depleted uranium because we did not have the technology to build a penetrator with enough kinetic energy other than using depleted uranium.

This year, with the Congress' support, we are shifting over to a tungsten penetrator, a small technology change but a big performance change. This penetrator made out of tungsten—I will pass some around—has 40 percent more kinetic energy on target. It increases the battlestation's CIWS system by 33 percent. That means that if we hit a cruise missile and kill it, we will kill it 33 percent further than we did with depleted uranium.

That is a small example of what advanced technology can do for us. This entire round cost about $10.98. The little tungsten penetrator you see there costs about $2.15. Not a lot of money but a tremendous war fighting payoff.

Going down the list here, we are doing a lot today in signature reduction. That is, reducing the capability of radar systems and acoustics systems and infrared systems to detect our ship. Since we are in open session, I cannot get into too much detail. But, against a band of radar frequencies one might take a look at today's FFG–7 frigate, such as the *Stark*, to a radar system that might look that big.

Today—put on the slide, please—I can make to selective radar systems—that ship relatively look about that size. That is a tremendous capability because a radar system that could see a ship at this size could perhaps see it at 50 or 100 nautical miles. If it appears this small to that particular radar frequency, it may not see it to 10 miles. That is going on today.

Back to the basic slide, please. Thank you.

We are getting into multi-spectral guidance where we are doing detection of the threat and engagement of the threat using more than just radar systems. Using combinations of radar systems and infrared systems.

We are into super-accurate navigation. We are about to deploy the global positioning system not only on our ships, but in 1992 it will be in our Tomahawk cruise missiles. The global positioning system, sized down to a little slice about that big, in our Tomahawk cruise missiles will give an instantaneous geographical accuracy worldwide of 50 feet autonomously, by itself. Tremendous improvement capability.

We are into directed energy. Not directed energy weapons on our ships such as sensors, but into warheads.

You have approved limited rate production on our Mark-50 torpedo which has a powerful warhead in it. That warhead, which is not much bigger than this, has the power to heavily damage a typical submarine. There is a lot of technology in that warhead, and it gives us the capability to achieve a destructive capability now which was almost impossible in the past unless one was using something like a nuclear weapon. That is an example.

Computer processing. We hear about it a lot. We use computers a lot. They have proven to be very reliable to us. But we have the capability now, through visic technology, to downsize and to put far more computational power into our combat control systems. The current Aegis radar which is going aboard our newest cruisers in the *Arleigh Burke* destroyer—I have the circuit board here which is about 3 million iterations per second and 50 percent faster than the basic radar board that was in *Spy*. This one board accounts for 22 larger boards that were much larger originally in the system. It is more reliable. It is cheaper to build. We do not have to worry about repair. We can do modular replacement of it. And, it has about 50 times the computational capacity as what was in the older Aegis systems just a few days ago. This is visic technology, and this technology in fact is going into our combat systems right now.

After we get all the machines built, men still have to operate them, and one of our biggest challenges is for men to have what we would call good recognition differential. Their ability to sort out whatever the machine tells them is going on, or their ability to visualize what an engagement might look like before they carry out an action.

I want to give you one example. In the Tomahawk cruise missile planning world there is a machine called the digital imagery workstation. That workstation, which is going aboard our ships right now for Tomahawk cruise missile planning, has the computational power of about 1,000 IBM-PCs. What is unique about it is that this machine can take a two-dimensional stereo photograph and it can translate it in three dimensions and once it is in three dimensions you can walk around a target and you can see exactly what perspective you will be seeing.

The three-dimensional images are not shown here. To give you an example, I could be sitting in Los Angeles and if I had a photograph of the Capitol, this machine could show me exactly how I would fly a mission going around the Capitol, behind the Smithsonian, and coming right back out. It can show me exactly what a pilot or a cruise missile planner would have to take into account without ever physically being in that location or seeing that target in real time.

This is what I call advances in recognition differential, where we are able to display an array for our sailors and our operators, very complex sets of information in a very simple process, and allow them to do far more accurate and intelligent mission planning for the future.

Mr. Chairman, I will conclude there. This is just a small snapshot. Other than to say that I will not dwell on these—in the 5-Year Defense Plan and the 1991 budget before Congress, these are the types of technology transitions which are occurring. Some of the evolutionary and some of them revolutionary. Next slide, please.

For almost all of our combat systems many of these technologies will lead into the 21st century and will satisfy the requirements that Admiral Nyquist talked to you about.

Mr. Chairman, with that I will conclude and have Admiral Nyquist make some closing comments.

Admiral NYQUIST. Mr Chairman, the two studies that we have talked to you about represent a major change in the way we in the surface warfare world do our business. We know what needs to be done. As Admiral Gee told you, we are looking at near term solutions as well as far into the future.

I would certainly want to take this opportunity to thank you for your continuing support. I would also, as one who is blessed with leading the surface warfare community—we are not talking just about surface combatants. We in the surface Navy have a majority of the ships in the Navy—all these changes that we are looking at have applications not only in the surface combatants but in our amphibious force ships and our combat logistic force ships and our other ships as well.

We appreciate this opportunity.

Senator KENNEDY. Thank you very much, Admiral and all of the panelists for a very complete and helpful presentation.

PRODUCTIONS AND RETIREMENTS

Admiral, in the annual report to the Congress for fiscal year 1990 which Secretary Carlucci sent over with the last Reagan administration budget, it states with reference to the shipbuilding request for authorization of construction of the five *Arleigh Burke* class destroyers that this rate of construction will barely keep pace with the retirements of the old AAW destroyers which based on our current objective of 120 battle force combatants are now slated to begin in fiscal year 1990. The fleet will remain short of these types of ships throughout the 1990s. Then Secretary Cheney presented the amended budget that calls for accelerated retirement of the old AAW ships.

So, based on this information, am I to understand that the requested building rate of five DDG–51s per year will now sustain less than 64 percent of the force of the AAW ships?

Admiral Nyquist. Mr. Chairman, we will certainly not achieve our goal as quickly as we might otherwise, and the earlier retirement of the DDG 2 and 37 classes certainly put a dip in the overall force structure.

But, in a constrained budget we believe that our leadership certainly supported the DDG 51 program by sticking to five. We have said five to six a year. I think in a constrained budget and with the deficits that we are looking at and the reductions that we must take, that five is a reasonable number and we will just have to go with that. It will take us longer but I think that in the face of the era of constrained budgets we face, that is a reasonable number, and I think that five is a number that will move us forward.

We are going to have—yes, we are going to retire those DDG 2s and 37s before there is a 1-for-1 replacement. But we will get through that era and, as I said, capability is the key. The DDG 51 in that near term will bring us tremendous capability compared to the ships that it is replacing.

Senator Kennedy. Well, I think that is a helpful answer. Some of us have been interested in the balance between the various capabilities of our Navy force. Some aspects are being overloaded and some of it underserved with regards to different parts of our Navy. I just wanted to get a better understanding of how you see where we will be with regards to the DDG capability.

Is it your understanding, then, that it does not fall below the 64 percent, or is it about that now? Or, will it be?

Admiral Nyquist. Yes, sir. It depends on how you measure it, but it is between 65 and 70 percent that we are down in our AAW capability. But in a constrained budget I think that the five DDG 51s a year is reasonable.

Senator Kennedy. Even at five, will it go below that now in the next several years with the retirement program that Secretary Cheney has talked about?

Admiral Nyquist. In the 5-Year Defense Plan, Mr. Chairman, it shows four DDG's in fiscal 1994. That is way off, but it is five in all the other years of the 5-Year Defense Plan.

Senator Kennedy. Moving to the electric drive program, I understand, two-thirds of the money provided for the program last year in the fiscal year was used for other programs. So——

Admiral Nyquist. Let me ask Captain Graham——

Senator Kennedy. I think the first question is why the Congress was not notified about this.

I do not want to take a lot of time now for that, but we can see that it has been a program which has been supported by the Congress. You commented about great hope on that, which I think there certainly appears to be great opportunity. But, as I understand it, those funds were rediverted last year and the Congress was not notified.

Captain Graham. Senator, the reason why we did not spend all the money appropriated was the fact that we had difficulty getting our prime contractor under contract. Because of that, there was a slower than expected buildup. We just did not have the contractor aboard to start the work.

That was the fundamental reason. It was certainly not that we did not want to do the work. So, we used the remainder of the money on standard missile improvements.

Senator **Kennedy**. Is the approximate figure of about two-thirds approximately correct?

Captain **Graham**. I believe so. Yes, sir.

Senator **Kennedy**. I would have thought that we probably could have known what that flow line was going to be at the time of the authorization or appropriation, or the difficulties that we were going to be facing. I would have thought that it would have been useful to keep us informed.

I mean, here is one of your prime areas of new technologies and last year we saw the sufficient diversion because of, I guess, the failures of the contracts; it is an enormously important area. It would seem to me that we ought to know about that as well as you—the difficulties that are being faced with the fulfillment of the contract.

Do you anticipate any further problems like that?

Captain **Graham**. No, sir. We have our initial prime contractor on board now so we do not anticipate that sort of problem in the near future.

ELECTRIC DRIVE

Senator **Cohen**. If I could just interrupt. Why is it if electric drive is going to be so revolutionary that we have got about $12 million in the fiscal 1990 budget?

Admiral **Nyquist**. Senator, some of the decisions to get on with that program were made late in the fiscal year not in time to affect this budget.

However, we have put what we believe in the 1990 and 1991 budget on the Hill, again in a constrained budget the essential elements to get on with integrated electric drive. We hope to have integrated electric drive in 1994 and be ready with an electric drive capability by late in this century. That is, by 1998 or so.

So, we believe that given the overall budget reductions we are facing we have got a pretty good balanced program.

Senator **Kennedy**. Captain Graham, you had indicated at some time that missed opportunity, the potential missed opportunity of not using electric drive—I guess in the DDG–51—you know, I suppose the question is whether we have identified that technology, given it sufficient support in the past or whether we are now at the present time just sort of rediscovering—or, discovering its potential and now sort of catching up.

We want to try to find out where we have been in terms of these technologies, what the Navy has supported, to try and develop some degree of continuity as we are going to be overseeing what the Navy is doing over these next several years in terms of the future.

So, I think there may very well have been a missed opportunity. I do not know whether Captain Graham wants to make any comment about it.

Captain GRAHAM. Well, sir, yes, we do consider missing electric drive in the DDG-51 a missed opportunity. It was certainly one of the candidates back in 1981 when we were in concept design. In the 11th hour it was deemed to be too risky at that time.

I think that is precisely why Admiral Trost made this bold commitment. He does not want another missed opportunity. He wants to lay out a consistent program so that we can be sure that we get it into the fleet at the next possible opportunity.

INNER COOLED REGENERATIVE GAS TURBINE TECHNOLOGY

Senator KENNEDY. Let's move to the inter cooled regenerative gas turbine technology. Does that have an application in terms of electric drive? I guess it has important implications in reducing the signature for ships from various weapons systems as well as in terms of reducing its signature in the water as well. Is that moving along?

Captain GRAHAM. Yes, sir. The inter cooled regenerative gas turbine is the prime mover of choice to match with the electric drive program. Together those are really the two big pillars of this cluster of machinery technologies that I described.

We have committed to that technology. We are working to get the initial major contract let by the end of this fiscal year. So, those are really the two fundamental pillars of this cluster of technology.

Senator KENNEDY. There are technology advantages to that independent of the electric drive?

Captain GRAHAM. Yes, sir. We would go with that without——

Senator KENNEDY. In any event?

Captain GRAHAM [continuing]. Electric drive. But together they form a tremendous synergistic pair.

Senator KENNEDY. On the hull and propulson technology, there still is the question on whether we always are going to depend on a propeller in developing high-speed hulls. I had an opportunity to be on a smaller boat that was going about 40 knots with the small jet pumps that draw about 3 feet and no propeller at all. It was developed, I believe, by the Italians.

What is your own view about how dependent we are going to be both on propeller use and also in the high-speed hulls? I guess the Japanese are moving along in the development of a program for high-speed hull for commercial use. We have been interested in it in this committee in terms of rapid sea use.

What can you tell us about both aspects, the development of the hull and also the water jet pump technology.

ADVANCED PROPULSOR SYSTEM

Captain GRAHAM. Senator, we have a line in that Cluster A called Advanced Propulsor System. The advanced propulsor picture I showed you was for counter-rotating forward-facing propeller. That is one of the options.

We also have as an option water jets and other propeller configurations. We will not make the final decision on that for about 2½ years. We have about 2 years of research as part of Cluster A that will lead us to that commitment decision.

You are absolutely correct. Water jets look very attractive. We are making those tradeoffs and that analysis at this time. We have not made the final commitment decision.

It will also depend on what hull form we select.

Senator **KENNEDY**. Is that being done out at your facility here?

Captain **GRAHAM**. Yes, sir, and we would certainly——

Senator **KENNEDY**. No, I want to take the opportunity to visit out there.

One other area that is somewhat different from what we have been talking about. That is, the development of the smaller patrol boats. I had the chance to be out in the gulf and see the support of the smaller boats in terms of some of the operations that we had out there, which was very important, and the desire of the fleet commanders to develop a greater capability for those small boats that particularly may be used in the future in these low intensity conflicts.

The question is whether that in the line of service is considered to be sufficiently professional to be on a reasonable track with the other offices in the Navy. We have heard some rumblings about that.

I think we heard some rumblings several years ago, for example, in the Special Operations Forces and the Green Berets. If you looked over the promotion rates in terms of individuals that have been in that aspect of the service, we are really on a different pace than those in other services in the military.

I am interested to find out whether that is going to be true in terms of the Navy as well in these small boats.

Admiral **NYQUIST**. Yes, sir, I have the connection, Mr. Chairman. Absolutely not. I would be the last one on earth to ever let anybody who commanded one of those patrol boats fall behind.

In fact, the kind of officers we send to those boats would be right at the top of our Navy and would be——

Senator **KENNEDY**. But it would certainly appear so because the degree of maturity, responsibility and knowledge would indicate that they have a very heavy responsibility.

Admiral **NYQUIST**. They certainly do.

Senator **KENNEDY**. And demand a good deal of maturity. I am pleased to hear it.

I appreciate it, Admiral. I am going to have to excuse myself. Senator Cohen is going to complete the hearing. But I would like to take the opportunity to come out—maybe with other members of the committee—to visit that facility that you have out there.

Admiral **NYQUIST**. Yes, sir.

Senator **KENNEDY**. It is close and I think it would be enormously interesting in terms of these technologies and would give us a better feel for it.

Thank you.

Senator **COHEN**. I would like to return, Admiral Nyquist, if I could, to—Captain Graham had some, I think, interesting analogies from "beam me up" to "beam me down, Scotty."

FLEXIBLE TRANSITION

In the discussion of flexible transition it occurred to me that a more perhaps colloquial analogy might be that of Pete Rose, although I am not sure Pete Rose is the appropriate person to think of in terms of baseball. What they do in baseball, is they take an outfielder, a power-hitter, and as he gets older, they move him to first base; eventually they shift him over to be a DH, and ultimately maybe even a manager.

I suppose we have essentially the same thing in this thing called flexible transition. But I guess the question, number one, when is Admiral Trost going to endorse it? Has he endorsed this concept yet?No.: 07304 -Name: Yogi Billet -Folios: 1075–1079 -Date: August 1, 1989 -Subformat:

Admiral NYQUIST. Yes sir.

Senator COHEN. Formally.

Admiral NYQUIST. Senator Cohen, he approved the Surface Combatant Force Requirement Study. I just cannot help to add into the baseball lore, then you have the Nolan Ryans who at 42 years are still striking out 11.

Senator COHEN. Well, I want to get back to that.

Admiral NYQUIST. Yes, sir.

Senator COHEN. Go ahead.

Admiral NYQUIST. But, yes, sir, the CNO has endorsed flexible transition. We all know what the risks are out there but it just appears to us that it makes sense that what we have been faced with, for example, in the Spruance class, the massive modernization that we have had to put into those ships. We do not want to have to repeat that, and in building a ship of DDG–51-like capability and beyond we believe is the way to go.

Senator COHEN. Well, what happens when they hit their midlife crisis as such? They are now 20 years old, they are now 42-year-old Nolan Ryans and perhaps not as good as he is. What kind of upgrades do you anticipate? Do you just sort of let them slide into middle age and have a less dangerous profile as such or less dangerous mission? Or, do you continue the program of significant modernization ? What is the plan?

Admiral NYQUIST. We believe, Senator, that it is going to be somewhat of a combination. Flexible transition means that we want to build the kind of ship that you do not need that massive modernization at midlife.

But we believe that, for example, in the vertical launch system—gives us a tremendous capability as the missile, the Tomahawk, for example, gets more and more modern, the ordnance is getting modernized. Yet, it will fit into that same vertical launch system that is now 20 years old. Once it gets out of that launcher, it is as modern as any that we are firing off the brand new ship.

We also look ahead to the time where the majority of modernization will be in computer programs. In the software rather than the hardware. The DDG–51, as a baseline, is a very software-intensive ship and has tremendous capability resident in those computer programs.

So, absolutely. We would never put a ship out there that could not take on a reasonable spectrum of the threat. It is just that we do not believe that we have to put ourselves in that position of having to essentially reconstruct a ship from scratch.

HIGH THREAT/LOW THREAT

Senator COHEN. Does the Navy still adhere to the notion of having a mix between high-threat/low-threat areas?

Admiral NYQUIST. No, sir. We do not talk about that any more. We used to call some ships high-value units. That is a name that not many of us ever liked and we have taken it out of the lexicon. We want to build quality ships, as we have shown you in the Surface Combatant Force Requirement Study approach. We are going to be building essentially the battle force combatant as the surface combatant of the future.

Senator COHEN. The point is that the Falklands war demonstrated there are very, if any, low-threat areas left as long as countries can have access to either Exocets or sophisticated missiles. There are no low-threat areas anymore are there?

Admiral NYQUIST. Yes, sir. I could not agree more.

CLUSTER TECHNOLOGIES

Senator COHEN. Captain Graham, you made a really important case for thinking about cluster technologies. I was wondering when is the Navy going to start submitting its R&D budget in cluster form.

Captain GRAHAM. I think it is going to take a while in the block programs, the 6.2 programs, which is the exploratory development. In the surface ship HM&E we will be getting this year our block plan which will be very oriented to clusters of technology.

Senator COHEN. What I have now, Captain, is I have these kind of line item gizmos, if I could borrow a phrase that was used before. It is a series of R&D projects with no integration in terms of analyzing their cluster or synergistic—to use your word—impact.

Captain GRAHAM. I personally am a great champion of that. I think it will take a while to orient today's R&D programs to a more systems engineering approach. But I think that is the wave of the future.

SEA LIFT SHIPS

Senator COHEN. Could I ask you—Captain Graham I guess should be appropriate here. What about signature reduction on military sea lift ships? I know we have sort of turned this over to what remains of the Merchant Marine. But, what about designing specific military sea lift ships with this in mind in terms of signature reduction? Do we need a special program? Is it something that should be integrated in the commercial field? How do we plan for signature reduction on the sea lift ships?

Captain GRAHAM. I believe what we ought to do is to start moving towards the concept while all of the military-related ships would have the lowest possible common signatures so that the enemy cannot discriminate one ship from another.

So, that would force us to have our sealift ships the same signature level as some of our military ships. I think it is an excellent idea.

Senator COHEN. Admiral Nyquist, I have one more question before I yield to my colleague.

WAKE REDUCTION

Nothing was said today about wake reduction. We have been hearing a lot about efforts made by the Soviets and by ourselves in terms of detection of ships by virtue of their wake, non-acoustical detection and so forth.

What are we doing with respect to reducing wakes of our ships?

Admiral NYQUIST. Senator Cohen, I would prefer to take care of that in a closed session or give you a briefing at your convenience, sir.

Senator COHEN. Senator Lott.

Senator LOTT. Thank you very much, Senator Cohen. Admiral, since I arrived as you were going through the answers to questions, two or three things came to my mind.

DDG–51

You mentioned that the plan for the next few years is to have five DDG–51s each year and then in fiscal year 1994 four. What is the total you are looking at now?

Admiral NYQUIST. The total, Senator Lott, is 120 battle force combatants. But that is the ultimate goal in the future.

Senator LOTT. No, I am talking about just the DDG–51 destroyer.

Admiral NYQUIST. The DDG–51 destroyer—we first have the 29 to build to replace the older DDGs. Beyond that, they will begin to replace our older cruisers.

For the foreseeable future, we see the DDG–51 and her successors being built in the region of five to six a year for a long time.

Senator LOTT. Are you talking about 60?

Admiral NYQUIST. Yes, sir. I really have not—I have not concentrated on that figure but, yes, it would be in that neighborhood. Probably beyond that a little bit.

LHD

Senator LOTT. I am very pleased to see, of course, that it looks like there is Navy support and DOD support for the fifth LHD. I know that there was some discussion about an upgrading of that fifth LHD. I guess it was of the propulsion system?

Admiral NYQUIST. Yes, sir.

Senator LOTT. What is the present status on that?

Admiral NYQUIST. We are still taking a look at that on a technical and war fighting basis of the possibility of converting the LHD 5—the fifth LHD—to a gas turbine propulsion. Right now we are weighing the tactical and the war fighting capabilities against the cost of doing that. But it is a way of getting away from steam propulsion in that class ship.

Senator LOTT. You do not have cost figures on that at this point in time?

Admiral NYQUIST. We are working on them, Senator, but we still have yet to make a final decision and take this one to the CNO.

ELECTRIC DRIVE

Senator LOTT. You indicated that for the electric drive you did not want to miss the next available opportunity. In your out-years what do you see as the next available opportunity?

Admiral NYQUIST. Senator, the CNO has told us that he wants the battle force combatant of the 21st century to have electric drive. Now, when exactly that will come, we do not know. But we would think that we want to deliver that ship somewhere in the first decade of the 21st century. So, that is what we see right now.

In the meantime, we will continue building the DDG-51 as a baseline ship in flights and upgrade them as we go.

SUBMARINE/SURFACE SHIP CAPABILITIES

Senator LOTT. Admiral, I guess there is a never-ending competition between modern submarine capabilities and surface ship antisubmarine capabilities. Where does the equation stand today as you see it?

Admiral NYQUIST. Senator, I do not think there is a submarine in the world that is going to be better than the SSN-21. I think we are building the right ship. In the DDG-51 and the Aegis cruiser now, I think we are building into those ships the very best in surface ship ASW capability.

So, I feel very good about what we are doing in not only the Aegis cruiser and destroyers, but also in the conversions we are making to the Spruance class with the SQQ-89 ASW system. There isn't a better surface ship ASW system in the world today.

Senator LOTT. Well, as a new member I obviously have a lot to learn about all this in the future. I am looking forward to working with you gentlemen.

Admiral NYQUIST. Thank you, sir.

Senator LOTT. We realize you do get occasionally diverted to Maine, but we would want you to spend as much time as possible in Mississippi.

Admiral NYQUIST. Thank you, sir.

Senator COHEN. I was wondering, Admiral, as you were responding to Senator Lott—did he take all the ships in Mississippi? Is that what he was suggesting? [Laughter.]

Admiral NYQUIST. He was being very fair, Senator.

Senator COHEN. Has there been discussion and concerns about the SSN-21 in terms of its radar signature by virtue of the periscope that has been——

Admiral NYQUIST. I had better take that one for the record, Senator Cohen. I am just not that familiar.

Senator COHEN. I am told there is a significant problem with it in terms of radar signatures that we were talking about earlier, about their reduction.

Admiral NYQUIST. We will be happy to get you an answer to that.

[Information will be retained in committee files.]

Senator COHEN. Thank you very much. It was a very impressive presentation. Perhaps we can take Senator Kennedy up on his suggestion that the members of the subcommittee might come out and visit your operations.

Thank you, Admiral.

Admiral **Nyquist**. Thank you, Senator.

[Whereupon, at 9:55 a.m. the hearing was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

MONDAY, MAY 15, 1989

U.S. Senate,
Subcommittee on Projection Forces
and Regional Defense,
Committee on Armed Services,
Washington, DC.

AIRCRAFT CARRIER FORCE STRUCTURE MANAGEMENT

The subcommittee met in open session at 2:33 p.m., Senator Edward M. Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Warner, Cohen, Wilson, and McCain.

Committee staff members present: Marie Fabrizio Dickinson, assistant chief clerk and Daniel G. Sakura, research assistant.

Professional staff members present: John J. Hamre and Norman G. Mosher.

Minority staff members present: Patrick A. Tucker, minority staff director and counsel; Romie L. Brownlee, deputy staff director for the minority; Durwood W. Ringo, Jr., Mark B. Robinson, and Ann Elise Sauer, professional staff members.

Staff assistants present: Tiffany E. Berger, Barbara Gallo, and Lori M. Jackson.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Milton D. Beach, assistant to Senator Glenn; Terrence M. Lynch, assistant to Senator Shelby; Grayson F. Winterling, assistant to Senator Warner; Anthony H. Cordesman, assistant to Senator McCain; Robert M. Soofer, assistant to Senator Gorton; and Charles Pearcy, assistant to Senator Lott.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator Kennedy. The hearing will come to order.

This is the fourth hearing this year of the Projection Forces and Regional Defense Subcommittee. The purpose of today's hearing is to receive testimony on the size and the future management of the aircraft carrier force. We will concentrate on three issues:

First is the number of deployable carrier battle groups. In this year's defense budget, Secretary Cheney has decided to postpone the expansion of the carrier force from 14 to 15 battle groups. When the *Abraham Lincoln* is commissioned in 1990, the *Coral Sea* will be retired. Similarly, when the *George Washington* is commissioned in 1992, the *Midway* will be retired.

By retiring these World War II carriers as new carriers join the fleet, the Navy's capabilities will grow, although the number of carriers will remain constant at 14. This is the approach that Senators Nunn and Levin and I proposed in an amendment to last year's defense budget.

By modernizing the existing force structure rather than seeking to expand it, we will have a more balanced and capable Navy. The savings generated by operating one fewer carrier can be used to fill the gaps we face in other essential elements of a battle group—planes, munitions, and escorts.

In this era of declining budgets, we must focus on bridging strategies that protect the core of our military capabilities from budget reductions. And by taking these reductions in force structure, the earlier retirement of the World War II carriers allows the Navy to protect its investments in the quality of its personnel and the superiority of its technology.

Second, we will review the budget request for the overhaul of the Nation's first nuclear aircraft carrier, *Enterprise*. This rehabilitation will cost nearly $2 billion and take the carrier out of service for 3½ years beginning in 1991.

We will examine the impact of this overhaul on the total carrier plan. To help us in that assessment, we have asked the Navy to provide a broader look at carrier plans than normally is requested, including an analysis of the long-term impact of the current proposal.

The third issue is the research and development plan for aircraft carriers. At previous hearings the Navy has presented plans for surface combatants and submarines. The importance of such a plan for aircraft carriers is clear. The next carrier to be authorized will be delivered after the turn of the century and will be operating for nearly half of that century.

For such a carrier we must look to new opportunities provided by technology. To rely solely on current technology and continue building *Nimitz* class carriers would be like sending the 1880s to sea in World War II.

This afternoon we will welcome back the Assistant Secretary of the Navy for Shipbuilding and Logistics, Everett Pyatt. With Mr. Pyatt is the Assistant Chief of the Naval Operations for Surface Warfare, Adm. John Nyquist.

Also here is the Assistant Chief of Naval Operations for Air Warfare, Adm. Robert Dunn. Admiral Dunn will be retiring this month and I would like to take this opportunity to thank him for his testimony and cooperation in past years. His contributions to the committee have always been appreciated and his professional opinion is highly regarded by all the members of the committee.

Admiral Dunn's relief is Adm. Dick Dunleavy, a Boston native. I am sure he will do well. [Laughter.]

He is here today and I would like to welcome him and assure him that we will look forward to working with him.

Before asking Secretary Pyatt to lead off this afternoon, I would like to invite Senator Cohen to make his opening comments.

Senator **Cohen**. Thank you, Mr. Chairman. I join in your remarks concerning Admiral Dunn and his successor from Boston. There seems to be an Irish connection there, or at least a tradition that is being maintained.

Most people think that we have or will have 14 deployable carriers in the years ahead; but one of those carriers is in overhaul and that carrier is assigned a Reserve air wing. In fact, in peacetime the Navy has only 13 Active air wings, and I doubt this fact is understood outside of the Navy. I think it has come time for the Navy to publicize this fact—the number of air wings we have—the same way it discusses the number of aircraft carriers.

I think this would contribute a great deal to the public understanding of the actual state of our military forces.

I too, look forward to discussions about future technology for aircraft carriers, although I am perhaps a bit more skeptical about the statement that current aircraft carrier design has become obsolete or so outmoded that it will not continue to serve us well into the next century.

But I look forward to hearing from all the witnesses and thank you for the testimony.

Senator **Kennedy**. Senator McCain.

Senator **McCain**. Mr. Chairman, I also look forward to this hearing and I am sure several more in the future on this very important issue of how we will maintain a sufficient number of carrier battle groups to take care of this Nation's national security interests.

I also would like to join you in praising the service of Admiral Dunn, not only in his present position, but in over 30 years of outstanding service to our Navy and our country. I hope we will be able to utilize his many talents in other ways in the future, and welcome Admiral Dunleavy. I hope that an interpreter will be provided when Admiral Dunleavy testifies. [Laughter.]

Mr. Chairman, just very briefly, we will get into some very esoteric and convoluted arguments, in my view, as to cost savings, whether indeed the *Enterprise* should be refueled and whether the *Midway* instead should be kept in service.

I have a lot of comments to make about it. I have studied the issue very deeply. I would like for one factor not to be lost in this argument over dollars, and that is, Mr. Chairman, I hope that you and every other member of this committee who is going to make this judgment will take the time to ask every naval aviator and every crewman who will have the opportunity to serve in the future of this country whether they want to serve on the *Enterprise* or the *Midway*, and whether they feel that they are in a safer environment, in a more comfortable environment, or whether we should subject them to serving for the next I do not know how many years on a ship that was built in World War II.

The focus of the Armed Services Committee in many ways, and I am proud to say, has been on the personnel issues, on readiness, morale, retention. And I would suggest to you that it is hard to quantify in dollars the difference between serving on a nuclear-powered aircraft carrier, which has relatively modern accouterments and living conditions, as opposed to subjecting those dedicated Navy personnel that we have to serving on an aircraft carrier which probably deserves to be retired at this time.

I think it is a factor that cannot be quantified in dollars and cents. I think you will hear that from the witnesses. But more importantly, I would recommend that you ask the pilots and the crewmen that have to live under those conditions.

I thank you, Mr. Chairman. I think it is an important issue that this subcommittee is taking up and I appreciate the opportunity to be involved in the debate and the discussion.

Thank you, Mr. Chairman.

Senator **Kennedy**. Senator Warner.

Senator **Warner**. Thank you, Mr. Chairman.

I have been following this issue, as you well know, for some time with my colleagues, and I am optimistic that wisdom and good judgment will prevail in this legislative cycle. But I would urge that before any decisions are made within this subcommittee structure, that we await the President's document on national strategy, which will be forthcoming in a few weeks. We have every reason to believe it will delineate with specificity the President's understanding of those commitments and his understanding of the assets we have to fulfill those commitments.

It is my expectation that this document will also provide a clear foundation for the number of carriers that the Joint Chiefs and, I anticipate, the Department of the Navy will advocate.

I thank the Chair.

Senator **Kennedy**. Mr. Pyatt, you may proceed with your statement.

Mr. **Pyatt**. Mr. Chairman, if it is appropriate I would like to ask Admiral Dunn to go first. His discussion deals with the broader issues of naval aviation and I believe they are important in the context of what you have asked us to talk about today.

STATEMENT OF VICE ADM. ROBERT F. DUNN, ASSISTANT CHIEF OF NAVAL OPERATIONS FOR AIR WARFARE

Admiral **Dunn**. Mr. Chairman and members of the committee: I would like to submit a formal statement for the record, with your permission, sir.

Senator **Kennedy**. Fine, that will be included.

Admiral **Dunn**. I would like to take just a moment to talk not only about aircraft carriers, but to bring you just a brief report on Naval aviation. Today that report is mixed, because I am proud of Naval aviation's performance today and in the recent past, but I am concerned about the future.

Because of your past support and investment in your Navy, today we would fare well in any sort of maritime conflict, whether that conflict be one of limited goals or all-out war. All of our deployable carriers, including *Coral Sea* and *Midway*, are meeting commitments today, along with our newest, the *Theodore Roosevelt*, which is now on station in the Mediterranean.

In fact, 9 of our 14 deployable aircraft carriers are at this moment at sea.

Readiness—that is people, ship, and aircraft readiness—is at an all-time high, where it ought to be. When called upon last April, Naval aviation put Iranian warships and gunboats out of action; and again in January 1989, when attacking Libyan MIG's were downed.

Our personnel are the best we have had, the best I have seen in my naval service. And because compensation is adequate and they have reasonable time at home, we are retaining them.

We have just completed the safest year in history in naval aviation: 2.16 accidents per 100,000 flight hours, 48 aircraft lost versus 73 aircraft lost in 1987, versus 714 aircraft lost the year I got my wings.

As of this morning, this year's record is even better, an overall rate of 1.82. But as good as things are today, I must report to you that I have concerns for the future. I have a concern about force structure. In peacetime we need a minimum of 15 carrier battle groups, many more in an all-out war.

With the 14 battle groups we have today, in order to maintain personnel tempo goals we must often skip commitments. There were times in the past when we made commitments at the expense of people and equipment. People and equipment paid the price when we had to extend deployments, such as 243 days for *Nimitz* and 253 days for *Eisenhower.*

Nobody wants to do that again. Secretary Cheney has said we will not do it again.

At the same time, we see a changing world situation, while it may appear now that any sort of military involvement with the Soviet Union is remote, at the same time there is a rise in nationalism and frequent instability in the Third World.

Third World nations are not third rate when it comes to weaponry. In fact, they have sophisticated weapons with long range and the latest technology. Their military establishments may not be as extensive as the U.S.S.R., but they are certainly as sophisticated.

Meanwhile, there are ever-increasing pressures to deny or limit the United States and allies access to overseas bases and overflight. There is increasing dependency on international trade.

The only military force that can fill this void, support allies and meet the increasing worldwide demand for deterrence and war-fighting should deterrence fail, is a highly mobile, flexible, capable force of the carrier battle group. Naval aviation at sea providing the absolutely essential element of air dominance, strike projection ashore and afloat, and anti-submarine warfare.

Carrier battle groups are essential to the United States to remain a world leader militarily, economically, and politically. Naval aviation is the force of choice, frequently called upon.

With its speed, it has the capability to provide the most rapid visibility to show our resolve. It is the most flexible, most mobile, and operating highly mobile and evasive carriers, it is the most formidable foe any adversary could expect to meet.

Our carriers provide a many fold return on the Nation's investment in several ways: maximum war-fighting capability should the need arise and maximum deterrence across all levels of conflict.

My second concern is capability of the force structure. For example, nuclear-powered carriers and modernized air wings provide a mix of aircraft and weapons to meet our long-range requirements at sea. And there is no substitute for nuclear capability.

Nuclear power brings us maximum operational flexibility, increased payload in aviation fuel and weapons storage, unlimited sailing range, long on tooth, short on tail. When comparing *Enterprise* versus *Midway,* consider that *Midway* is capable, *Enterprise* is more capable. And we will increase that capability during her refueling and modernization period and she will be available for another 20 years.

The carrier battle group offers flexibility from mere presence to air dominance and power projection. The future will offer technological advances in aircraft and ship design. As the plans for our first *Nimitz* class are the cornerstone for our newest CVN, the orderly maintenance, modernization, and replacement process allows the flexibility to incorporate proven advanced technology.

CVN–74 is far different from CVN–68. And I would invite your particular attention to Mr. Pyatt's statement, pages 3, 4, and 5, where he talks of some of the improvements, the technological advances we have made in succeeding iterations of the *Nimitz* class.

My third concern is investment in our people. Highly motivated, experienced people in sufficient numbers are the greatest contributor to readiness. We do not want to repeat the mistakes of the seventies, when we drove our equipment and people beyond reasonable limits.

We want to preserve the framework for future growth, but at the same time ensure that fiscal realities are recognized and managed, because when the Navy is called upon—and it surely will be—we need to be ready with an effective and flexible response.

Mr. Chairman, naval aviation is on station today and ready. But the world is changing. The need for mobile, flexible, forward-deployed naval forces; naval aviation forces which can sustain a long-term presence without dependence upon foreign bases, will increase.

As in the past, we need your support to do our job.

Thank you very much.

[The prepared statement of Admiral Dunn follows:]

STATEMENT OF

VICE ADMIRAL ROBERT F. DUNN

ASSISTANT CHIEF OF NAVAL OPERATIONS

(AIR WARFARE)

INTRODUCTION

Mr. Chairman and distinguished members of the subcommittee, I appreciate your invitation to discuss the nation's requirement for aircraft carrier battle groups.

Aircraft carrier battle groups are essential in support of National Security Strategy: A forward deployed strategy. Too few deployable carriers means unfulfilled commitments to Fleet Commanders and the Joint Chiefs or allies, overstressing our people and equipment, lack of readiness to respond, or all three. Secretary Cheney is committed to reducing deployment levels, if necessary, to maintain adequate readiness and avoid overstressing our people.

Aircraft carriers are the cornerstone of the Navy and Naval Aviation. The Navy's primary power projection capability is centered around aircraft carriers because the aircraft aboard those ships do so much to enhance the basic mobility, flexibility and global reach of seapower.

The nation expects our aircraft carriers to be on-station, ready to do the job, just as they have been doing since World War II. During peacetime, to ensure we have sufficient ships on station, to meet both global commitments and crisis situations, provide an acceptable personnel tempo and allow for adequate maintenance periods, we need sufficient deployable carriers. We cannot risk overstretching our people and severely degrading our equipment. Force levels and commitments must be maintained in balance to avoid these risks.

REQUIREMENT

Naval carrier battle groups and amphibious forces have long served as primary instruments of national contingency response. Since World War II, naval forces have been called upon to respond in over 80 percent of the crisis/regional conflicts in which our nation's military forces have been involved (over 250 occasions). The peace-keeping mission in Lebanon, capture of the Achille Lauro hijackers, retaliation against Libya for the Berlin disco bombing, Grenada, support for Korea during the Summer Olympics, Persian Gulf escort operations, air strike against Iran's Navy, and mine clearance are recent examples where naval forces (CVBGs in particular) have played a key role or made major contributions.

Highly versatile, mobile naval forces, centered around our CVBGs and amphibious forces, operating routinely in forward deployment areas can adopt a wide range of military profiles in support of diplomatic initiatives. The broad spectrum of discriminate force employment options they offer are uniquely suited to match National Command Authority (NCA) requirements across the lower levels of conflict. A particular strength in using maritime forces for such purposes is the ability to rapidly constitute the required forces in a forward area and maintain the visible capability for direct military action over an extended period. Visible "signals" of U.S. military forces capabilities are particularly critical in contingency/Third World operations. This can be done by carrier battle groups with their full spectrum of options, with minimal support, lessening the impact on friendly host nations. Most significantly, maritime forces can more easily be withdrawn unilaterally when that serves national policy objectives.

Third World regional and low intensity conflicts are likely to continue, undoubtedly resulting in significant demands on U.S. military forces and resources. Yet, U. S. forces face increasing restrictions on their activities overseas. Weapons inventories of Third World countries are becoming increasingly sophisticated, making it more difficult and dangerous to deal with these conflicts. Such factors place a premium on a military force that continues to be flexible, visible, and on-scene, with conspicuous striking power. The special characteristics and global disposition of our CVBGs and sea-based amphibious forces make them uniquely well-suited to protect U.S interests in the lower range of the conflict spectrum. Their ability to respond in a timely manner with the right level of force to match whatever requirements our NCA might have supports the continued need for these forces in adequate numbers.

DEFENSE

Despite the continuing success of aircraft carrier battle groups, in war and in peace, arguments for fewer carriers persist. I will address some of those arguments now; I can answer other arguments during questioning should you so desire.

We do have sufficient aircraft to equip our deployable carriers. Should the simultaneous sailing of all carriers be directed, each deck would have a fully equipped air wing. It might be necessary to draw down temporarily on training squadrons and aircraft in re-work, but all decks would be fully manned. In a multi-carrier war, such actions would surely be justified. In peacetime, when all carriers are not required for deployment, we certainly have sufficient airplanes for deployment, training, and re-work.

We do have enough spares for all aircraft carriers. We have, in hand, sufficient deployable sets of Aviation Consolidated Allowance List (AVCAL). This is in addition to AVCALs assigned to Marine air groups. There once was a time when we had insufficient AVCAL, but that is no longer true.

We do have sufficient General Service Equipment, "yellow gear", to do the job. Spot shortages do occur from time to time. However, it is normally only in specialized equipment shortfalls which are quickly solved thorough accelerated procurement and rapid repair.

We do have sufficient people to man the carriers and air wings. The quality of our officer and enlisted aviation personnel, carrier and airwing, has never been better. The people are well trained, smart, enthusiastic and have the best morale I have seen in my 38 years. If carrier force levels fall while our global commitments remain constant, our most precious asset, people, will be over-extended and the breakdown that occurred in the 1970s will surely be repeated. We simply cannot afford to let that happen again.

As the CNO has recently stated, "We are currently planning and budgeting for the refueling and overhaul of USS ENTERPRISE, an eight-reactor, one-of-a-kind carrier. At inception of this refueling/overhaul period, this ship will be 27 years old. The planned refueling/overhaul will give our nation the benefit of as much as twenty more years of service from this major capital investment. A considerable portion of the cost is already 'sunk cost.' To drop her from our inventory of 'warfighters' would truly be an irresponsible act."

Additionally, USS ENTERPRISE is required, with or without additional new construction of aircraft carriers, to meet our requirements for the most capable deployable CVBGs in the late 1990s. Without ENTERPRISE, we cannot even maintain the fourteen most capable deployable carriers for the foreseeable future.

CAPABILITY

The national strategy is one of deterrence though forward defense.

We are an island nation dependent upon the sea lines of communication for our national survival and to support our allies. We can no longer be assured that the facilities for our ground and land-based forces will be available when we need them. Thus, highly mobile Navy and Marine forces have become even more critically important factors in protecting American security interests in an uncertain world. Treaty negotiations, basing rights, overflight privileges, and political instability in host countries are inherent shortcomings of land-based air. In the 1950s, the United States paid for the USS FORRESTAL and Wheelus Air Base in Libya; we still own and deploy FORRESTAL. In the 1960s, Congress funded the USS KENNEDY and the bases at Cam Rahn Bay and Da Nang in Vietnam; today, the Soviet Navy calls Cam Rahn Bay a "home port." We still own and deploy KENNEDY. In the late 1970s, the Shah of Iran was our friend in a relatively peaceful Persian Gulf, and the United States was starting to procure USS THEODORE ROOSEVELT. Today, THEODORE ROOSEVELT is sailing with the SIXTH FLEET on her initial deployment - Iran is no longer a friend. We have had a near continuous carrier battle group presence, since 1979, in the Indian Ocean/North Arabian Sea. We are hopeful for world peace. But, again, we cannot accurately predict ten years hence what will occur in a world which is witnessing increasing nationalism and the proliferation of sophisticated weapons. We must remember that it takes seven years to deliver a new carrier. Additionally, two to three more years are required for the appropriation process and the new carrier and crew to work up to actual forward deployment.

Just as the angle deck, Fresnel landing lens, hydraulic then steam catapults have evolved, future technology and capability will only enhance carrier aviation. The NIMITZ class aircraft carrier, as the cornerstone of the carrier battle group, has demonstrated its awesome capability and flexibility on numerous occasions in support of vital national interests. Until we witness a dramatic breakthrough in technology such as in fusion, there is every reason to believe that the large deck nuclear powered carrier will continue to serve our Nation's needs well into the future. An orderly maintenance, modernization and replacement process allows for maximum flexibility to incorporate proven advanced technology. However, the Navy is not just marking time, but rather is investigating improvements to the NIMITZ class as well as alternatives to large deck carriers, to ensure that our nation maintains the most capable and powerful Naval force in the world. At this time, our preliminary studies indicate that evolutionary changes to the carrier battle group and associated tactics are more likely than any revolutionary developments.

Toward the goal of improving the aircraft carrier of the future and investigating available options, numerous efforts are in work. Recently, better coordination of future development of aircraft carriers and support ships to enhance the overall operational capability of the battle force has been initiated. Navy laboratories such as Naval Air Development Center and David Taylor Research Center are formulating study groups to help in selecting the best clusters of technologies to achieve future goals and we are full partners in those efforts. We are continuing in our efforts to "neck-down" the number of different types of aircraft carried in an airwing and to optimize that mix in order to increase our flexibility and operational capability. Project February and Carrier Air Wing Study '89 are efforts to define and establish solutions to future air power requirements. Additionally, technologies that demonstrate promise: stealth, reductions or modifications of all types of signatures; advanced launch and recovery systems, including electromagnetic catapult, powered lift technology and advanced propulsion-electric drive, are also under active investigation. As always, reducing production and procurement costs as well as saving manpower are always foremost in our efforts.

The national military strategy requires CVBGs. Since world events can change rapidly and it takes a long time to construct carriers, reducing CV force levels creates added risks. The proper number of carriers should be available to respond wherever and whenever needed. Aircraft carriers, deployed in peacetime, are on station and ready to respond to a wide spectrum of demands from simple presence through crisis intervention and if directed sustained conflict. Without forward deployed carriers, as some propose, the delay in on-scene presence means increased risk of higher level conflict than we have historically anticipated.

SUMMARY

This nation must stand firm in its resolve to provide leadership to the free world and to those who have aspirations of freedom and democracy. Carrier battle groups provide an umbrella of security throughout the world on a daily basis. Carrier force levels are too vital to the nation's interests to fluctuate with the cyclic budgetary process. The point of focus should not be solely this year's budget, but also what we may expect 30 or 40 years from now. Certainly, there will be a need for seapower. World geography will not change. Basic philosophies of government will not be dramatically altered. There may be realignment; however, little movement can be expected in general economic relationships around the world. Seapower, guaranteeing avenues for friends and trading partners and giving pause to those who would thwart our peaceful pursuits, will continue.

The inherent characteristics of seapower--global reach, mobility, flexibility, and self-support--will continue to be major factors underpinning of our nation's economic, political and military well-being. Just as today, it will be seapower that extends reach by capitalizing on the inherent speed, mobility and flexibility afforded by carrier aviation. A strong Navy built around carrier battle groups will enable the United States to continue to play the role it has to play in the changing world despite evolution in the political, military, and economic environment.

Our national military strategy is first and foremost a strategy which calls for deterrence of conflict through forward deployments and cohesive relationships with our friends and allies throughout the globe. One needs only to scan today's headlines to realize that we live with a violent peace and must remain prepared to defend our interests whenever and wherever called. In defending our interests, the record is absolutely clear -- aircraft carrier battle groups are an indispensable and often used force available to the President to demonstrate and back up commitments to our friends and allies, and thus continue to defend our own interests overseas.

Senator KENNEDY. Mr. Pyatt.

STATEMENT OF HON. EVERETT PYATT, ASSISTANT SECRETARY OF THE NAVY FOR SHIPBUILDING AND LOGISTICS, ACCOMPANIED BY VICE ADM. ROBERT F. DUNN, ASSISTANT CHIEF OF NAVAL OPERATIONS FOR AIR WARFARE; AND VICE ADM. JOHN W. NYQUIST, ASSISTANT CHIEF OF NAVAL OPERATIONS FOR SURFACE WARFARE

Mr. PYATT. Thank you, Mr. Chairman.

It is within this overall perspective that we tried to design a carrier replacement and maintenance program. We will talk about that a little bit, but we tried to match operational requirements, force level goals, production capability, business strategy, into an integrated long-term program. And with the wisdom, foresight, and the help of Congress, I believe we successfully implemented this program.

Our aircraft carrier replacement program was established for looking into the 21st century. For example, in the year 2020 *Carl Vinson* will be 38 years old. *Carl Vinson* will be one of at least six nuclear aircraft carriers now in the fleet or under construction that will be in service in 2020.

Our latest one under construction now, CVN-75, is expected to remain in service beyond 2030. And I would invite you, sir, in my testimony, which I ask to be entered into the record, to this chart, because in response to your question of looking at the future and trying to develop an understanding of what we have and what we have to work with, this is a good little summary.

I would take a moment just to help explain some Navy jargon here. A COH means a complex overhaul. It takes about a year and it is done infrequently.

A little further down you will see a term called a SLEP, service life extension program. It is the program undertaken for the *Forrestal* class to add about 15 years of service life to those ships. It has been very successful and worked out very well.

Enterprise is a topic of discussion today and here you will see a time called a refueling complex overhaul to take place in the early nineties. At that time, we will have a situation where we are beginning the refueling cycles of all of our nuclear carriers and we will see the tail-off of the service life extension programs for the conventional carriers and the beginning of the refueling.

It is in this transition period where we have a couple of ships out a year in major work in the shipyards. This work would be expected to carry on from 2 to 4 years.

Senator COHEN. Mr. Pyatt, could I just interrupt here.

Mr. PYATT. Yes, sir.

Senator COHEN. Could you explain to me the difference between a SLEP program, where I take it the ship is not deployable under that status?

Mr. PYATT. Yes, sir.

Senator COHEN. What is the difference between a SLEP and a complex overhaul? Why is a ship in a complex overhaul or a nuclear refueling situation considered to be deployable?

Mr. PYATT. In the complex overhaul, the rationale has been that that is work of about a year's duration. If the instructions came out to put the ship to sea, it is conceivable you could put the ship back together and get it to sea in a reasonable amount of time.

Senator COHEN. Well, how much time?

Admiral DUNN. Well, it depends on where it is in the overhaul, Senator.

Senator KENNEDY. Well, if you take the *Enterprise,* for example, that is going to be a lot more than 18 months. As I understand, it is 3.2 years approximately.

Mr. PYATT. Three and a half years.

Senator KENNEDY. I do not want to get ahead of you, but you are cutting out some major portions in the flight deck as well.

Mr. PYATT. From my perspective as a ship repairer and ship builder, once you go in past a year and tear up a ship for that long, I do not think it is possible to put it back as a deployable ship in a reasonable amount of time.

It is kind of the same logic as with the SLEP's. We all agreed that the SLEP is going to be in from 2 years to 30 months, depending upon the ship, and we took those off of the deployable status.

I believe when you start looking—this is my opinion. When you start looking at the *Enterprise* or these major refuelings of the *Nimitz* class, you are talking 2 to 4 years work, and the tearing apart that goes on to do the work is very substantial.

Senator COHEN. I just raised the question because we keep talking about deployable ships and yet in some of those categories, if you are talking about a complex overhaul, that ship cannot be called out to sea at a moment's notice. It may take weeks or months.

Mr. **Pyatt**. Yes, sir.

Senator **Kennedy**. Well, just to finish up with Senator Cohen's point, which I think is an excellent one, is it not at least fairer or more accurate to not list those ships as being deployable during that period of time?

Mr. **Pyatt**. I believe that, again, once you go beyond a year, as a matter of accuracy you should not list a ship as deployable.

Senator **Kennedy**. Admiral Nyquist or Admiral Dunn, would you like to comment on that?

I do not want to spend a lot of time on semantics, but I think you are talking about more than semantics.

Mr. **Pyatt**. Yes, sir.

Senator **Kennedy**. You are talking about the deployable and the non-deployable, and I think the point is well taken. I just think in terms of the accuracy and perception that if it is as Mr. Pyatt has mentioned and I think as logic would dictate, that it ought not to be reflected as being a deployable ship.

Admiral **Dunn**. If I may take a crack at that, sir. I agree with Mr. Pyatt, 1 year is the approximate cutoff between deployable and non-deployable, and the reason we are not being as precise about this as I would wish to be, it depends on how much the ship is torn down.

As you go into an overhaul, more and more of it is torn apart, and when you get to a certain point, more and more of it is put back together. To answer the question of how long does it take, it depends on where it is in the overhaul.

Senator **Kennedy**. Well, the only thing, Admiral, and then let us move on, if you would look at the Navy's own document with regards to the *Enterprise*, the *Nimitz*, and *Dwight Eisenhower*, all of those are 2 years. I hear what you are saying, but you give us the various material. We certainly have to draw a different conclusion, at least I would, about its deployability.

I have a chart. I mean, you provided one here today which I was using in preparation for the hearing one that you provided as of January 30, 1989. And if you look at each of those categories in the out years, the longest period of time is clearly the *Enterprise*.

But the *Nimitz* and the *Dwight Eisenhower*, appear to be more than 18 months. I think the point has been made. I think you have Senator Cohen's and my own concern about it. Why do you not take a look at it?

Let us keep going.

Mr. **Pyatt**. I think it is a very legitimate issue and one that needs to be pursued, because shipbuilding has the longest planning horizon of any defense enterprise because of long construction periods and service lives. We have to try to look ahead some.

But it is also important to make some stable plans for various aspects of shipbuilding and ship repair, as well as for the aviation that goes on them. I look upon ships, aircraft carriers, as a modular weapons system. We have a modern aircraft carrier and the aircraft that goes with it, and therefore you can configure the ship to do a lot of different things because you can reconfigure the aircraft.

As aircraft technology advances, we can also change the structure of the combatant capability of a particular carrier. That is why even though aging, *Coral Sea* and *Midway* are still better than any foreign aircraft carrier in the world. Continued technology advancement of the aircraft capabilities maintains the naval air force at the peak of its capability even for these old ships.

The current design concept of large deck nuclear aircrafts represents the state of engineering technology that has been optimized over the years and proved in combat. We have kept pace in the new carriers with improved systems and equipment that are part of the fleet modernization program. We have pursued a consistent product improvement approach.

Even though these ships look the same on the outside, they are substantially different on the inside. For example, we introduced improved self-defense systems on the *Carl Vinson,* CVN–70. In *Theodore Roosevelt,* we introduced magazine side protection and advanced combat direction system with new computers.

In CVN–72 and CVN–73, we introduced low-smoke cable, low pressure steam catapults to extend propulsion plant life, digital instrumentation for reactor control, solid state aircraft landing systems, and improved electronic warfare capability.

With the constrained environment of CVN–74 and CVN–75 and our attempt to control the costs, we maintained rigorous configuration control, but have made some improvements, including updated sensors and communications suite. We are also examining fiber optic technology for application in CVN–74 and CVN–75.

From this solid base of today's technology, we expect to make further advances in parallel with aircraft technology and weapons technology. There is a whole list of things that are going on and I am sure as they evolve we will find ways to bring them into the ships on an incremental basis, as well as some of the technology in steel that helps to put less weight into structure and more weight into other useful purposes.

However, in looking at the future, I would expect to see future aircraft carriers look very much the same as they do now. They will be monohulls. Carriers will still have large decks and small islands, with a large hull underneath to carry the volume of aircraft, weapons, fuel, and people required to make the carrier a key constituent of national sea power.

Within this hull there can be advanced systems, more survivability, and possibly fewer people. These ships will keep pace with the advancing technology and match the evolving threats of naval warfare.

The second building block of our program is the complementary strategy of new construction, service life extension, and the maintenance of our ships. Force levels are a balance of new construction rate and service life. We have established the service life extension program and adopted maintenance approaches that will assure at least a 40-year service life.

With this service life, we will need to begin production of a new carrier about every 3 years or two new aircraft carriers every 6 years. Congress wisely funded two carriers in 1983 and again in fiscal year 1988.

Fully funding two carriers in the same year has many economic advantages, and we talked about them in this committee 2 years ago. It allows heel-to-toe production for optimal work force allocation. The economies of scale and inflation avoidance in ordering two complete ship sets are impressive, and we proved it.

For example, the two fiscal year 1983 carriers were originally estimated to cost $8 billion in split annual awards. The current estimated end cost of these two ships is $6.2 billion, a savings of $1.8 billion.

Furthermore, the General Accounting Office estimated that our initial incrementally funded split award plan for CVN-74 and CVN-75 would save seven-tenths of a billion compared to separate annual awards.

Congress wisely funded both of these carriers in fiscal year 1988 and we were able to reduce the incrementally funded estimated end cost from about $7 billion to $6.2 billion, a savings of $1.4 billion below separate annual awards. And this is a case where we were able, because we had to, to set up in the GFE and in the ship production doing two at a time, setting up serial production, design control, and they are being built.

The combined savings on these four carriers is $3.2 billion. In effect, our construction business plan has saved enough money to buy another aircraft carrier.

We have included long lead money for aircraft carrier production in fiscal year 1994 for fiscal year 1996 contract to continue the long-term replacement program.

The wisdom of fully funding two carriers together has been proved twice, and we hope the future will not change. As we build new carriers, we will transition from our older carriers in an orderly approach. The oldest and smaller carriers will be replaced first, and the newer, more capable conventionally powered carriers will have their service lives extended.

Three carriers have completed the service life extension program to date and their successful operation at sea has proved the value of this effort.

Another key element in our orderly transition plan is the refueling of the first nuclear carrier, *Enterprise,* CVN-65. This refueling will give *Enterprise* nuclear fuel for 20 more years of operation. The work package for the refueling overhaul is well-defined. The size and complexity of the nuclear refueling and complex overhaul is comparable to a service life extension program on a conventionally powered carrier.

During the nineties, we will have 1 carrier undergoing refueling on a continuous basis and overlapping the service life extension program, placing two carriers in the midst of long-term overhauls in the early nineties. And that is the point Senator Cohen was making.

Phase 1 of the *Enterprise* overhaul includes refueling and reactor plant work which is estimated to cost about a billion dollars. Phase 1 also includes aviation support systems overhauls, upgrade of auxiliary systems and fire fighting and various structural repairs. This part of phase 1 is estimated to cost about $400 million.

The total cost of phase 1 is about $1.5 billion. Of this, about a half a billion dollars is in sunk costs through fiscal year 1989, leaving about a billion dollars to remain.

Phase 2 of the *Enterprise* overhaul includes a number of ship modernization alterations. These total about $400 million. But I would also say that this is repair work, a lot of which emerges over time, and it is very hard to completely categorize at this time. This is based on experience of what other ships have cost.

I would like to reiterate some of the points that Admiral Dunn made on *Enterprise*. It is a proven nuclear carrier with a full war-fighting capability. It is younger than eight of our carriers and it has the war-fighting advantages of nuclear propulsion, including virtually unlimited range and endurance at maximum speed, freedom from the pipeline for ship propulsion fuel, at least 50 percent more aviation fuel capacity, and much greater aviation munition capacity—all of which go together to make a combatant ship.

Furthermore, *Enterprise* is in excellent condition, as shown by the recent Pacific Fleet Battle E Award. The refueling, modernization and repair work items can be completed within the $1.861 billion cost estimate of phases 1 and 2.

Of this, about half a billion has been funded, leaving about $1.4 billion to go. This modernized carrier with a full air wing capability will then serve into the second decade of the 21st century, until its replacement is appropriated some time after the year 2000.

Prematurely retiring *Enterprise*, with 40 percent of service life remaining, would incur a near-term cost for defueling and disposal of roughly $600 million. This is based on submarine experience, and it is a very big job. We have not yet prepared the environmental impact statements for disposal of nuclear-powered aircraft carriers. However, for submarines we started this process in 1978 and it was not until 1985 that a final determination was made allowing us to go ahead with removal of reactors from the old submarines.

Moreover, retiring *Enterprise* now would waste the existing on-hand refueling reactor cores, which have a fuel equivalent value of about $550 million at current oil prices. There is really two things there.

If you chose to recycle the cores, the cost of recycling the cores is about equal to the value of the material that you would get from them. Second, this points out that when you buy the cores for a nuclear ship you are buying 20 years of fuel. You know what it is going to cost. The Navy pays back DOE on an annual basis what we use, and therefore the Navy O&M account is isolated from that portion of fluctuation dealing with fossil fuels. It can be a substantial number.

The backbone of our deployable capability at sea is a robust and effective maintenance program. We have established and integrated a maintenance and modernization plan that balances new construction, service life extension, projected refuelings, complex overhauls, maintenance availabilities, across our public and private industrial activities on the Atlantic and Pacific coasts. That is no small task, I might say.

As we balanced this program, we were able to accelerate two service life extension programs and eliminate two complex overhauls, eliminated one service life extension program, replacing it with a complex overhaul. This overhaul strategy revision, which considered the shape each ship was in, resulted in a cost savings of about $1 billion and in the process would better optimize our workload distribution to the various industrial activities of the country.

So, I would just like to summarize now by saying, aircraft carriers are the most powerful ships in the world across the complete spectrum of conventional conflict. I do not need to tell you that. Their ability to conduct high firepower, sustained strikes day after day against all levels of threat is unmatched by any other type of ship in any other country.

This unmatched capability results from the integration of high performance aircraft with the best attributes of weight, volume, sustainability, performance, and ship technologies. I do not believe this is going to change over the next 50 years.

As aircraft performance grows, aircraft carrier performance as a component of sea power will grow. Air power at sea is the fundamental determinant of sea power, and as far as I can see it will remain so indefinitely.

Accordingly, we have firmly established our long-term carrier replacement programs on two fundamental precepts. The first building block is technology innovation; the second building block is complementary strategic planning and program execution of new carrier construction, service life extension, and maintenance.

We have tried to apply common sense, practical and astute planning, program and business strategies, and I must say we have been strongly supported by the Congress in all of these efforts.

We have tried to make full and balanced use of all of our industrial facilities, public and private, on both coasts. But furthermore, I believe we have delivered what we promised. Congress has helped turn this vision into a reality.

For a good number of decades, I have seen strong support for the carriers from the Congress, and this jointly applied the best principles of cooperative executive and legislative branches, and I think our successful program is the result. That is why I am proud to be associated with the program.

That ends my remarks.

[The prepared statement of Mr. Pyatt follows:]

STATEMENT OF

EVERETT PYATT

ASSISTANT SECRETARY OF THE NAVY (SHIPBUILDING AND LOGISTICS)

AIRCRAFT CARRIERS AND SEAPOWER

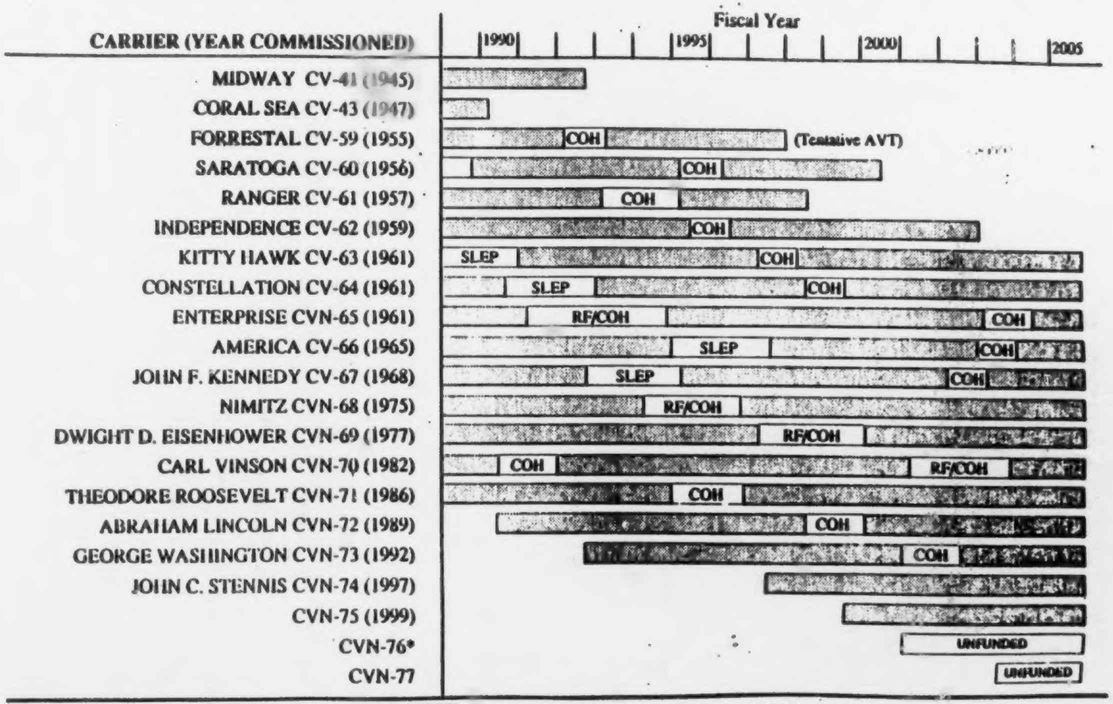
I am pleased to be here today to talk about airpower at sea and the programs we have to maintain air superiority of our Navy. Airpower is a fundamental determinant of military strength, especially at sea. The navy that dominates the air at sea will win. The navy that does not will lose, or will choose not to fight at all. This has been proved over and over again in general war as in World War II, and in lower intensity conflicts that have occurred since World War II. There is no substitute for continued air power at sea. As technologies emerge in future aircraft, and aircraft carriers that employ these aircraft as weapons, airpower will remain a fundamental determinant of seapower.

That is why we have embarked upon our long term aircraft carrier replacement program as shown on Figure 1. We have matched operational requirements, force level goals, production capacity, and business strategy into an integrated long term stable program. With the wisdom, foresight, and help of Congress, we have successfully implemented this program.

Our aircraft carrier replacement program has established the basis for United States seapower from now into the middle of the Twenty-first Century. For example, in the year 2020, CARL VINSON, CVN 70, will be 38 years old. CARL VINSON will be one of at least six nuclear aircraft carriers now in the fleet or under construction that will be in service in 2020. Our latest carrier under construction now, CVN 75, is expected to remain in service well beyond the year 2030.

U.S. NAVY AIRCRAFT CARRIER MASTER PLAN

5/10/89



COH	Complex Overhaul	SLEP	Service Life Extension Program, Carrier Not Deployable
RF/COH	Nuclear Refueling/Complex Overhaul	AVT	Aviation Training Ship
*	Advanced Procurement in FY 1994		

This Master Plan reflects recent decisions affecting the aircraft carrier force level. The plan remains fairly firm through FY 1994. Plans for FY 1995 through FY 2005 will require continuing review. SLEP and refueling overhaul (RF/COH) depictions should remain as scheduled. COHs and retirements will require additional review as the year of execution approaches.

Shipbuilding has the longest planning horizon of any defense enterprise because of the long construction period and long service lives of ships. It is therefore incumbent upon us to make long term stable plans, commit to these plans, and then execute these plans in the most militarily effective, cost effective and business effective way possible. The success of our comprehensive carrier program speaks for itself, but I will summarize some of the highlights.

TECHNOLOGY

The first building block of our carrier program is technology. The modern aircraft carrier is the ultimate "modular" ship because its primary weapon -- the aircraft it carries -- can be any configuration compatible with the physical interfaces of the ship. As aircraft technology advances, these advanced modular "weapons" bring cutting edge warfighting capability to the carrier. The warfighting technology of the carrier is always as current as the latest aircraft embarked on board.

This is why, even though aging, CORAL SEA and MIDWAY are better than any foreign aircraft carriers at sea in the world today. Continued technology advancement in aircraft capabilities maintains our carrier force at the peak of seapower capability, even for ships commissioned in the 1940s. This same trend will apply to the carriers being built today. These modular ships, when operating the latest technology aircraft of the 2030s and 2040s, will be powerful contributors to seapower.

Also, ship technology has advanced and we now build ships that are large enough to carry a more comprehensive and powerful airwing than the carriers of 1940s design. Modern nuclear carriers have long range at high speed, better seakeeping for sustained flight operations, larger aircraft weapons magazines and aircraft fuel stowage capacity for longer sustained combat operations between replenishments, more catapults, and advanced survivability systems for reducing vulnerability and increasing damage tolerance.

The current design concept for large deck nuclear carriers represents a state of engineering technology that has been optimized over the years and proved in combat. We have continually improved aircraft carrier performance through technology innovation. We have kept pace in new carriers with improved systems and equipment that are part of the fleet modernization program and we have pursued a consistent product improvement approach. For example, we introduced improved self defense systems in CARL VINSON, CVN 70. In THEODORE ROOSEVELT, CVN 71, we introduced magazine side protection and advanced combat direction system with UYK-43 computers. With CVN 72/73, we introduced low smoke cable, low pressure steam catapults to extend propulsion plant life, digital instrumentation for reactor control, solid-state aircraft landing system, and added improved electronic warfare capability. With a more cost constrained environment for CVN 74/75, we have maintained rigorous configuration control, but have made additional improvements including updated sensors and communications suite. We are also examining fiber optic topology for application to CVN 74/75.

From this solid base of today's technology, we expect to make further advances in ship technology that will parallel advances in aircraft technology and in weapons technology. We are developing and implementing advanced armoring systems to increase the survivability of carriers. Advanced self defense weapons for protecting against missiles and torpedoes will be part of carriers of the future. The whole field of information technology as applied to our command, control, communication, and intelligence systems is advancing at an incredible pace. We will capture these advances in future carriers. Our vigorous program in nuclear propulsion product improvement will enhance future aircraft carriers. Manpower intensive maintenance and repair concepts for both aircraft and ship systems are being supplanted by modern maintenance concepts in advanced technology equipment. Fiber optic data highways is a technology whose time has come and will be adapted into future carriers. Expert systems are in an embryonic stage now, but the technology of artificial intelligence will play a role in systems developed for future carriers. We are developing higher strength steels and other advanced, low maintenance materials with application to future carriers.

In parallel with incorporating technological advances into the evolving NIMITZ class carrier product line, over the next year we will begin a study to review and evaluate aircraft carrier operational requirements. The results of this study will guide technology innovation in future carriers.

We should expect that future carriers will have much the same outward appearance as they continue to evolve, because their configuration is driven by the laws of physics as related to the operation of high performance aircraft. Carriers will have large decks and small islands with a large hull underneath to carry the volume of aircraft, weapons, fuel, and people required to make the carrier a key constituent of national seapower. Within this hull, there will be advanced systems, more survivability, and probably fewer people. These ships will keep pace with advancing technologies and will match the evolving threats in naval warfare.

STRATEGIC PLANNING AND PROGRAMS

The second building block of our program embraces complementary strategies in new construction, service life extension, and maintenance plans and programs. Force levels are a balance of new construction rate and service life. We have established service life extension programs and adopted maintenance approaches that will assure at least a 40-year service life. With this service life, we need to begin production of each new carrier about every three years, or two new carriers about every six years. Congress wisely funded two carriers in FY 1983 and again in FY 1988.

Fully funding two carriers in the same year has many economic advantages. It allows heel-to-toe production for optimal work force allocation. The economies of scale and inflation avoidance in ordering two complete ship sets of material are impressive.

We have proved this in program execution. For example, the two FY 1983 carriers were originally estimated to cost $8.024 billion in split annual awards. The current estimated end cost of these two ships is $6.189 billion, a savings of $1.835 billion. Furthermore, the General Accounting Office estimated that our initial incrementally funded split award plan for CVN 74/75 would save over $0.700 billion compared to separate annual awards. Congress wisely fully funded both of these carriers in FY 1988 and we were able to reduce the incrementally funded estimated end cost from $6.966 billion to $6.225 billion, a savings of $1.441 billion below separate annual awards.

The combined savings on these four carriers is over $3.2 billion. In effect, our new construction business plan has saved enough money to buy another aircraft carrier. We have included long lead money for aircraft carrier production in FY 1994 for an FY 1996 contract to continue the long term carrier replacement program. The wisdom of fully funding two carriers together has been proved twice and this lesson from history will not change.

As we continue to build new carriers, we will transition from our aging older carriers in an orderly approach. The oldest and smallest carriers will be replaced first and the newer, more capable conventionally powered carriers will have their service lives extended. Three carriers have completed this service life extension program to date, and their successful operation at sea has proved the value of this effort.

Another key element of our orderly transition plan is the refueling of our first nuclear carrier ENTERPRISE, CVN 65. This refueling will give ENTERPRISE the nuclear fuel for 20 more years of operation. The work package for the nuclear refueling overhaul and the non-nuclear modernization ship alterations is well defined. The size and complexity of a nuclear refueling and complex overhaul is comparable to a service life extension program on a conventionally powered carrier. During the 1990s we will have one carrier undergoing refueling on a continuous basis and overlapping the service life extension program placing two carriers in the midst of long term overhauls in the early 1990s.

Phase I of the ENTERPRISE overhaul includes refueling and reactor plant work which is estimated to cost $1.017 billion, including material and preparation costs. Phase I also includes aviation support systems overhauls; upgrades in auxiliary systems and firefighting systems; and various structural repairs, piping replacement, valve repairs, painting, dry-docking, and preventive maintenance. This part of phase I is estimated to cost $0.444 billion. The total cost of phase I is $1.461 billion. Of this, $0.465 billion is sunk cost through FY 1989, leaving only $0.996 billion to be funded for phase I.

Phase II of the ENTERPRISE overhaul includes a number of detailed ship modernization alterations. These will complete preparatory work begun in phase I and will range from complex alterations for upgrading combat systems, aviation support, and weapons magazines to the more routine relocation of task lights. Each ship alteration has a detailed material and man-day cost estimate. The phase II work package is estimated to cost $400 million as supported by detailed cost breakdowns. Cost estimates by work category are as follows:

Aviation Support	$18.8 million
Command, Control, Communications	22.9
Weapons	10.0
Auxiliary Systems, Air Conditioning, Ventilation	24.9
Ship's Force Repair Package - Habitability upgrade - Interior communications repairs	9.0
Shipyard Repair Package - Non-propulsion auxiliaries - Command, control, communications - Catapults, arresting gear support - Weapons systems and elevators - Combat systems	314.4
	400.0

As we get closer to the beginning of the overhaul, there will be work definition conferences to adjust the priorities of individual work items to reflect the condition of the ship and the relative importance of modernization priorities within the funding estimates. Repair items will be subject to normal overhaul "open and inspect" procedures to determine which equipments are in need of repair during the overhaul.

ENTERPRISE is a proven nuclear carrier with full warfighting capability. ENTERPRISE is younger than eight of our carriers and has the tactical warfighting advantages of nuclear propulsion, including:

- Virtually unlimited range and endurance at maximum speed,
- Freedom from the pipeline for ship propulsion fuel,
- At least 50% more aviation fuel capacity, and
- Greater aircraft munitions capacity.

Furthermore, ENTERPRISE is in excellent condition as shown by the recent Pacific Fleet "Battle E" award. The refueling, modernization, and repair work items can be completed within the $1.861 billion cost estimate for phases I and II. Of this, $0.465 billion has already been funded, leaving $1.396 billion to be funded. This modernized carrier with full airwing capability will then serve into the second decade of the Twenty-first Century until its replacement is appropriated in about the year 2005.

Prematurely retiring ENTERPRISE --with 40 percent service life remaining-- would incur a near term cost for defueling and disposal of roughly $600 million. We have not yet prepared environment impact statements for disposal of nuclear powered aircraft carriers. For submarines, we started this process in 1978 and it was not until 1985 that a final determination was made. Moreover, retiring ENTERPRISE would waste the existing, on-hand refueling reactor cores which have a fuel oil equivalent value of about $550 million at current oil prices.

The bedrock of our deployable carrier capability at sea is a robust and effective maintenance program for carriers in the fleet. We have established an integrated maintenance and modernization plan that balances new construction, service life extension, projected refuelings, complex overhauls, and maintenance availabilities across our public and private industrial facilities on the Atlantic and Pacific coasts. As we balanced this program, we were able to accelerate two service life extension programs eliminating two complex overhauls, and eliminated one service life extension program replacing it with a complex overhaul. This strategy resulted in cost savings exceeding $1 billion and optimized workload distribution in our industrial facilities.

The value of integrated, long term strategic planning, strong program commitment, and effective program execution has been proved again.

SUMMARY

Aircraft carriers are the most powerful ships in the world across the spectrum of conventional conflict. Their ability to conduct high firepower, sustained strikes day after day, against all levels of threat is unmatched by any other type of ship.

This unmatched capability results from the integration of high performance aircraft technologies with the best attributes of the weight, volume, and sustainability performance of ship technologies. This will not change in the next 50 years. As aircraft performance grows, aircraft carrier performance as a component of seapower will grow. Airpower at sea is a fundamental determinant of seapower and will remain so indefinitely.

Accordingly, we have firmly established our long term carrier replacement program on two fundamental precepts. The first building block is technology innovation. The second building block is complementary strategic planning and program execution in carrier new construction, service life extension, and maintenance. We have applied common sense, practical, and astute planning, program, and business strategies and we have been strongly supported by Congress in our efforts. We have made full and balanced use of all carrier industrial facilities, public and private, on both coasts.

We have delivered what we promised. With the foresight and help of Congress we have turned vision into reality. We have jointly applied the best principles of cooperative executive and legislative government, and our successful force building program is the result. The American people are the beneficiaries of our joint efforts as we lay out the backbone of United States seapower for the next 50 years.

REFUELING/SLEP

Senator KENNEDY. Let us try and do 15 minutes for questioning. I will ask the clerk to keep the time.

Now, as I understand they are classifying the refueling of the *Enterprise* as an overhaul and not a SLEP. Is that right, Mr. Pyatt?

Mr. PYATT. It is not a SLEP; it is a refueling overhaul.

Senator KENNEDY. On the major parameters of the funding level, the duration, the availability, the deployment and purpose, the rehabilitation of the *Enterprise* appears comparable to the SLEP of a conventionally powered carrier. As I understand it, on the funding, the *Enterprise* will cost 10 times the price of an overhaul and at least $2 billion, nearly three times the price of a SLEP.

The entire overhaul and refueling cycle for *Enterprise* of 42 months is much more comparable to a SLEP, which is 28, than an overhaul, which is 12. The availability we talked about earlier. It is clear that once we begin to cut through the flight deck of *Enterprise,* it will be unavailable for deployment like a carrier in a SLEP.

And the purpose of the *Enterprise* refueling is comparable to a SLEP in that it adds the 20 years of life to the ship. And that the refueling of *Enterprise,* is a SLEP, not an overhaul, that was recognized in 1985 by John Lehman.

You all know that the significance is, first, the funding is from the shipbuilding account. Another on the O&M account, with all the implications that that has, about not having a very designated figure and finding out that we have already authorized and spent $500 million, a figure which we will get into later.

And second, as I say, it comes out of O&M and not shipbuilding.

Why did Lehman say it should have been treated one way and you say another way?

Mr. PYATT. Well, I do not know why he said that. I happen to feel from my responsibilities of looking at the program they are comparable in scope, and I do not know why it is in one account versus the other. It has just historically been that way.

Senator KENNEDY. Now, you understand the significance and the importance of it?

Mr. PYATT. Yes, sir.

Senator KENNEDY. Both in terms of how it is accounted for and I imagine, even the oversight function. We would be able to know what is going to be spent and how much is going to be spent, and the drawdown of the O&M account.

I mean, if it looks like a duck and walks like a duck and quacks like a duck, it is a duck. And if you look at the criteria which the Navy establishes as the distinction between these two items, it seems to me that it comes much closer.

It goes beyond the SLEP time duration vulnerability than it does as an overhaul, and yet its implications in terms of accounting and in real terms, that account, the O&M account, has important implications.

And of course it comes back then in the broader sense between the makeup of the surface fleet and also the training and readiness issue. That is what I am hearing. That is the way I look at it.

So I am just interested in hearing you out as to why you look at it differently.

Senator **Cohen**. If I could just interrupt, I think it is probably the first time the chairman has ever cited former Secretary Lehman as scripture. [Laughter.]

Senator **Kennedy**. Quietly, quietly. I thought he had a pretty good piece in the New York Times.

Mr. **Pyatt**. I went back trying to answer the same question for my own edification, and I do not know why it is there. It is a major program.

Senator **Kennedy**. Well, would you take a look at it?

Mr. **Pyatt**. Sure, I would be glad to.

Senator **Kennedy**. Mainly because of the implications that it does have on the O&M.

Mr. **Pyatt**. I would be glad to execute it in SCN because it gives you one other advantage: there is a firm fixed cost on it and we know what we are managing to, and I can hold the program manager more accountable. And that sounds like a good reason to me.

Senator **Kennedy**. I appreciate that. Until last year we had difficulty in knowing what the costs and the time implications were going to be. And obviously, that makes it more difficult to find out where that money is coming from in terms of the budget and where to look in the coming budget in terms of the future as well, because you have got a number of these items that are going to be in the budget in the future.

So I think it would be enormously helpful just in terms of our ability to understand that more completely to get that kind of information.

As I understand, the *Enterprise* is 32 months in phase 1, which is primarily refueling. Phase 2 is the overhaul, an indeterminate length of time. When will we know how long it will be?

Mr. **Pyatt**. I think as the work packages get better defined and we get closer to it. This is one of the frustrations with dealing with what is largely a repair package. You have to kind of wait for things to break before you know what to fix.

I think I would guess in the 9-month category to a year, or less.

Senator **Kennedy**. It will take that long before we will know, even after the 32 months? It will take us another 9 months before we will know how long it will be in phase 2?

Mr. **Pyatt**. No, sir, I meant to execute phase 2.

Senator **Kennedy**. So your estimate now in phase 2 is approximately what, 9 or 10 months?

Mr. **Pyatt**. That is a Pyatt estimate again, again based upon the things that evolve in the ship operation between now and then.

CAPABILITY OF THE ENTERPRISE

Senator **Kennedy**. Moving on, with regards to the whole question about the capability of the *Enterprise*—and I think all of us acknowledge what you have stated, and that is that it has got enormous capability in meeting the mission which is designated for it to meet as a part of our projection at sea.

The fact is, though, that this keel was laid in 1958, and if the history of this ship is as others laid at that time, using basically mid-fifties technology. I am sure that that has been certainly updated in a number of ways. But now we are talking about, with the whole refitting of this ship having it out there in the line another 20 years.

I heard what you say about that you believe that, whatever is going to be the future, a platform is pretty much going to resemble what we have at the present time. Well, I think I have had the good opportunity in actually the last 3 weeks to visit the SSN–21 and know about the relationship in terms of the DARPA recommendations and the development of future designs.

I am aware, as you know very well, what happened with the development of the SWATH technology, which we initially developed. The Japanese perfected it, and then we were able to bring it out, and it was out of your leadership that we were able to do so.

But I am just wondering whether it is not the better part of wisdom to have the kind of review of research in terms of the whole capability of technology for the carrier. It may very well come up that this is just what it ought to be in the future.

But would you not feel a lot better if you had the review of the various kinds of technology with regards to hull and hull design and the propulsion, all the other essentials, all the other necessary equipment, if we had a real review of the existing technologies, the potential for projected technologies, and then said, well, okay, this is where we want to end up.

Mr. PYATT. I think those periodic reviews are helpful, and again I think one of the things that has come out is to focus on doing that for the future, particularly in some of the internal characteristics of the ship. It is a big ship. There are 5,000 people in there, and there must be ways that we can do things better.

But still, when you talk about a number of catapults to basically throw airplanes off the deck, there is not too many ways you can configure that, and it is still going to wind up with a flat spot and as small an island as possible.

SURFACE FORCE

Senator KENNEDY. On page 5 of your statement, you talk about the results of the study that you will start next year, and you will provide this to Congress. Is this on the surface force?

Mr. PYATT. Yes, sir.

Senator KENNEDY. "Review and evaluate aircraft carrier operational requirements. The results of this study will guide technology innovation in future carriers."

When you get that, will you provide that to us?

Mr. PYATT. Yes, sir.

Senator KENNEDY. Thank you.

My time is up. Senator Cohen.

NEW TECHNOLOGY

Senator COHEN. If I could follow up; perhaps, Admiral Nyquist, you could tell us a bit about the new technology that is being considered by the Navy. We heard testimony last week, or so, that there are a cluster of technologies being considered.

But as I understand it, in dealing with aircraft carriers, one objective in the future would be to reduce radar signatures. Is that not one of the major goals as far as shipbuilding is concerned, to reduce radar signatures? And that presents a unique problem for an aircraft carrier, which is going to remain significant in size no matter what is done with composite materials or to the superstructure. You will still have a very large ship, if we are going to stay with large ships.

So it seems to me you have got one of two options: you can either seek to reduce the radar signature of a large ship to make it appear smaller, or you can try to converse, and that is to enhance the radar signature of a smaller ship to make it look larger, so as to confuse the enemy surveillance.

What is your recommendation in terms of the way in which we appear to be going?

Admiral **Nyquist**. Senator Cohen, you will recall——

Senator **Cohen**. If you could use the microphone.

Admiral **Nyquist**. You will recall from our Future of the Surface Navy briefing a couple of weeks ago we talked about that very issue, and the first thing we have to do—and Admiral Dunn is doing that—is looking at the operational requirements that will define the future carrier. And that is the first thing that we are going to do, and we are going to be working very closely on that.

In the meantime, at places like the David Taylor Research Center Captain Graham and his people are looking at just those issues of reducing radar cross-section. And I could go into more detail in a closed session, but there are some things that we could do.

You will also recall that in the ship operational characteristics study which I described, that talked about 12 imperatives. Many, many of those will apply to any ship of the future, including the aircraft carrier. So everything we are doing at the David Taylor Research Center and in the subsequent research and development that we will be doing over the next 15 to 20 years to bring us into the 21st century will have, we believe, applicability in many respects to carriers.

And I will be working very closely with Admiral Dunn and Admiral Dunleavy in doing that.

VSTOL AIRCRAFT

Senator **Cohen**. Do you foresee the existence of VSTOL aircraft changing the shape of things to come?

Admiral **Nyquist**. I do, but I would ask Admiral Dunn to talk about that, sir.

Admiral **Dunn**. There is a place for VSTOL, a big place for VSTOL, in naval aviation. As technology improves and we pay less of a penalty for vertical lift and vertical landing in the aircraft we have, we anticipate with eagerness the possibility of doing away with catapults and arresting gear and the need to turn into the wind to operate aircraft.

This, however, does not preclude the need for a large deck for aircraft. We have a large deck aircraft carrier not because of the catapults and the arresting gear, but we have a large deck aircraft carrier in order to concentrate force and capitalize on the economy of scale by putting a lot of aircraft of various types in the same hull and at the same time carry vast amounts of ordnance and fuel for those aircraft.

So yes, there is a place for VSTOL, but I do not anticipate it driving significant changes as far as hull form or propulsion in a carrier.

Senator COHEN. VSTOL is an issue which was examined in great detail 7 or 8 years ago. Senator Hart of course was a member of the committee at that time, and insisted on a study of VSTOL, which I welcomed.

But what the examination revealed is that smaller decks—40,000 tons I think is the size he was looking at at that time—did not give you very much in the way of projection of force. We found that you are talking about, roughly, 38 aircraft on a small deck, half of which would be used for the defense of the ship itself; so smaller carrier size does not give you much in the way of projection of power. It does not give you the kind of defensive protection available from large carriers.

Smaller size carriers also required more ships, total, to be deployed to get the same degree of power projection. So I think we have in fact been willing to doubt first principles and have demonstrated a willingness to examine the viability of the big deck into the future.

NAVY ESTIMATES

Let me turn to Secretary Pyatt and ask you a question. Some question was raised about the credibility of the estimates the Navy has given; for example, the costs already incurred for the *Enterprise* as far as the overhaul is concerned. I think you have estimated this cost to be what, $500——

Mr. PYATT. Approximately $500 million.

Senator COHEN. Questions have been raised as to the accuracy of those costs. Questions have been raised as to the Navy's projection of what it would cost for the safe disposal of the *Enterprise.* I think you have indicated this might be another $400 million approximately.

We are looking at roughly $1 billion just to take the *Enterprise* out of action whereas we can have a complete overhaul for something just under $2 billion, according to the figures.

You also indicate this will give you 20 years of fuel. That has not been the case in the past. This is the third refueling overhaul for the *Enterprise,* as I recall.

So perhaps, you would explain why we should have confidence in the figures you have given for the $500 million already spent and the $400 million that would be spent for the disposal? And, what the improvements have been made in the fuel for the *Enterprise* that would allow it to go 20 years, rather them 10 or 12 or 15?

And I am asking that because my time is going to run out.

Mr. PYATT. I understand.

First of all, the current estimate for defueling and laying up *Enterprise* is $600 million. That was put together by the people in the nuclear reactors office based on their current experience with the submarines. And I would say that, because this is the first time for a big ship and the amount of time that we have been arguing about it—we have been arguing about it internally, too, probably about a year.

So I would just represent that number, $600 million, as a good faith best estimate of what it would cost.

On the refueling cycle, I believe that first refueling cycle was short. The second refueling cycle—I am just trying to think of when, early seventies. So it is going to be almost 20 years on this fuel now. So I think that would give a representation as to why you should believe our 20 year number.

1969 is the note just given to me of when the current fuel was placed in the ship. So I think that is credibility there that the next fuel is 20 years.

The total. The best I can say on the total, and this is a matter I guess personal—the issue that Senator Kennedy was raising a bit ago about where it is funded. Put it in SCN and you have got a number and the number is what we are giving you.

There has been enough work done on this ship in preparation, I am convinced we know what it is going to cost, with the exception of the repair work that may evolve, and I hope you understand that.

Senator COHEN. Admiral Dunn, why would continuation of the *Midway* not be a better alternative to the overhaul of the *Enterprise?*

Admiral DUNN. The *Midway,* while it is a capable ship, is a much less capable ship than *Enterprise.* The *Midway* had only two catapults, which means it launches aircraft at a slower rate. It does not have the sea-keeping capability because it is a smaller ship in terms of total tonnage.

The *Midway* is not capable of operating the F–14 fleet air defense fighter. The *Midway* will not be capable of operating either the naval version of the ATF or the A–12 when it comes in the inventory.

BLISTER ON MIDWAY

Senator COHEN. Tell us about the problem of the blister on the *Midway* and what it would cost to correct it?

Admiral DUNN. What happened, Senator, was over the years *Midway* had been modified successively to where the damaged stability of the ship was in jeopardy, that is the stability of the ship when it takes a certain type of hit. The danger of capsizing was increased.

To correct that, the ship was expanded in the hull in order to provide more buoyancy, which corrected the damaged stability and also corrected a particular phenomenon peculiar to that ship where it describes a figure 8 in the water as it moves along and makes it difficult, sometimes to fly the glide slope.

Both of those deficiencies were corrected. What happened at the same time, and it was unforeseen to the extent, was the fact that the roll rate was increased with the addition of these blisters. That is, the ship has a very rapid roll back and forth in certain sea conditions.

It does not have an extremely serious effect on the operation of aircraft, but it has a very serious effect on moving aircraft around the deck or performing maintenance on the aircraft after they have once landed and before they are launched again.

There is a plan for correcting that, but that plan is being held in abeyance at this time.

Senator COHEN. What is the projected cost of the plan if it should be activated?

Admiral DUNN. $40 million.

Senator COHEN. That is all I have.

Senator KENNEDY. Thank you, Senator.

I remember we were talking about some of these points last year when we were talking about early retirement of the *Coral Sea,* and it seemed that those were not too difficult problems to overcome at that time.

Mr. PYATT. Well, it is not difficult overcoming the problems. It is just with a couple of years left it did not make any sense too go ahead.

Senator KENNEDY. I frankly think the case has been made for the *Enterprise* when you are looking down the line and looking at the earlier retirements and the flow line in terms of refueling the other aircraft carriers in those out years.

Senator McCain.

Senator MCCAIN. Thank you, Mr. Chairman.

15-CARRIER BATTLE GROUP

Let me just follow on to what Senator Cohen was saying on this issue of the *Enterprise* and *Midway,* and just say, we have agreed that we will now have 14 carrier battle groups from now on, unless national strategy changes again, is that right, Admiral Dunn?

Admiral DUNN. My understanding, sir, is the requirement is still for 15 carrier battle groups, but because of the current fiscal environment and affordability we have elected to stick with 14 for the foreseeable future.

Senator MCCAIN. Now if the *Enterprise* is decommissioned there is no foreseeable replacement for that except for extension of the *Midway,* is that correct, in order to maintain 14 carrier battle groups?

Admiral DUNN. That is correct.

Senator MCCAIN. So how long would the *Midway* have to be kept in service, in your view, if the *Enterprise* were not refueled and taken out of commission?

Admiral DUNN. Well, *Midway* would have to be kept in service until 1997, with the commissioning of the U.S.S. *John Stennis.*

Senator MCCAIN. And that would then give us?

Admiral DUNN. That would keep us at 14.

Senator MCCAIN. That would keep us at 14, so that would keep the *Midway* in existence an additional how many years?

Mr. PYATT. You have lost a ship there.

Admiral DUNN. Excuse me, my Secretary says I have lost a ship.

Mr. PYATT. I think you have lost a ship.

Senator KENNEDY. Five years, I believe. It would extend it over the projection for 5 years, over what had been.

Mr. **Pyatt**. I am sorry.

Admiral **Dunn**. Yes, sir, 5 years beyond the current plan.

Senator **McCain**. Beyond the current plan. And as you just said in response to Senator Cohen's question, the *Midway* not only is not as capable as far as war-fighting is concerned, but also it is not capable of handling our newer aircraft that we are expecting to come into the fleet.

Admiral **Dunn**. That is correct.

Senator **McCain**. Including the F–14, which obviously is already in the fleet.

ENTERPRISE VERSUS MIDWAY LIVING/OPERATIONAL CONDITIONS

And could you comment on both the living conditions as well as the operational conditions on board as far as the *Enterprise* versus the *Midway* is concerned?

Admiral **Dunn**. Well, there is hardly any comparison between the two as far as living conditions or operations. Taking operations first, of course we have already covered the fact that the *Enterprise* carries—I believe we have covered the fact that the *Enterprise* carries about 50 percent more fuel, about 50 percent more armament. Therefore it is less dependent on a logistics tail, whether that will be shore-based or sea-based. It gives the operational commander, and the unified commander, much more flexibility.

As far as the individual sailor is concerned, we have many more labor-saving devices. The engineering spaces are constructed to where we can use fewer people in the engineering plant of *Enterprise* than in *Midway*.

Midway was constructed, as has already been mentioned, with World War II or pre-World War II ideas on habitability. Although we have upgraded *Midway* over the years, we have not been able to come close to the habitability standards of a more modern ship.

HIGHER ACCIDENT RATES

Senator **McCain**. Historically, is there higher accident rates on board *Midway* and the *Coral Sea* as opposed to the larger deck carriers?

Admiral **Dunn**. I would have to look into that and submit a precise answer for the record. But I believe that the accident rates are comparable. But that has to be caveated with the idea that we do not operate the same kinds of aircrafts, nor do we operate at the same tempo off of those ships as we do off the *Enterprise* or other comparable classes.

Senator **McCain**. If you asked a naval aviator which kind of carrier he would prefer operating on, would he feel very strongly?

Admiral **Dunn**. Absolutely, he would feel very strongly.

Senator **McCain**. Or she.

Admiral **Dunn**. In fact, given his choice he would rather operate off of a 300,000-ton ship, a ULCC. [Laughter.]

Senator **McCain**. How about if he had the choice between the two?

Admiral **Dunn**. Between the two, the *Enterprise* would be the ship of choice.

F-14

Senator McCain. Let me switch to the F-14's. Admiral Dunn, in your personal opinion can the Navy afford to stop the F-14 production line before the ATF is nearing completion of its development phase?

Admiral Dunn. We should not stop that production, Senator. The President's budget does not include F-14's in it because of affordability reasons. I am afraid that stopping that production at this time, however, will put us in jeopardy toward the end of the century, when we are banking on the Navy ATF coming in to replace it.

Even under current plans, we will face a shortfall of F-14's starting in about 1995.

Senator McCain. This is something that I hope that you can clarify. We received written testimony that the Navy will not have a shortfall of aircraft. Yet in testimony before this committee a couple of weeks ago Admiral Trost said he was concerned about a shortfall of aircraft in the mid-1990s, and you have just stated that as well.

I am curious. What is the case here?

Admiral Dunn. Well, I think that it depends on what time period we are talking about, Senator McCain. And if the question is not phrased exactly right, we an get a misleading answer.

Today in 1989 the Navy has 477 F-14's of all varieties—F-14A, A-plus, and F-14D. The requirement is for 458, so we actually have an excess of F-14's today. In 1995 that excess will turn to a deficiency of a small number, and as I recall the small number is about two.

But by the year 2000, barring new production of some sort, we will have a shortfall of 56 F-14's.

Senator McCain. Admiral Dunn, you are aware that the F-14 has some very unique capabilities—the ability to defend the outer perimeter of the carrier battle group. Are you confident that we will still have that capability if we cancel the F-14 at this time?

Admiral Dunn. We will have the capability, but it will be at the expense of people. You understand, of course, that even when we do not have new production, we will have the remanufactured F-14. So we will have the F-14D in the inventory beyond the year 2000.

But since we have insufficient F-14's, we will be driven into transferring them from carrier to carrier as those ships deploy, using up the service life of those we have back home that much sooner. And at some point in time we will then be unable to meet our commitments.

Senator McCain. Returning to the *Enterprise* for one second, I think it is well that we look at the cost of this refueling and overhaul, in that this gives us that aircraft carrier for another 20 years, is that not correct?

Admiral Dunn. That is correct.

Senator McCain. Should not the costs of this refueling be looked at in that context, as opposed to over a 2- or 3-year period?

Admiral Dunn. I would think so.

Mr. PYATT. Yes, it is an investment required to get the 20 years that is already in the ship and to refuel it. Yes, you are right.

Senator MCCAIN. Admiral Dunn, I have been handed a piece of paper from my staff, as occasionally happens around here, and it says—this is from the Congressional Research Service—says that the F-14 requirement has a projected shortfall of 110 aircraft at the end of fiscal year 1996. Is that correct?

Admiral DUNN. I cannot comment on that, Senator, because I have—as you know, in response to congressional direction, we submitted a report on naval aviation to the Congress. That report was based on the Reagan budget, so the figures have changed a little bit from that report. It has changed a little bit as a result of the Bush budget.

Senator COHEN. I might point out that the Navy is still using OMB figures and we are using CBO figures. [Laughter.]

Admiral DUNN. Well, in this case, sir, if CBO is reporting a shortfall of 110, well, I would concur with them. [Laughter.]

Senator MCCAIN. Sorry I asked.

Senator KENNEDY. Have they not changed the criteria, though, in terms of the ages of the planes? As I understand, the re-evaluation and assessment of it was different from some of the earlier material that was provided to different members of different committees.

That is my impression. I apologize for not having the details, but I believe that has been the case also. And if you would use the older criteria or the criteria which they were using previously, you get a more significant figure, as I understand.

Senator MCCAIN. Mr. Chairman, I think you are correct. I think it is different from the figures that we used last year or 2 years ago in a similar discussion of the carrier issue.

I would appreciate it anyway, Admiral, if you would provide us for the record exactly what that shortfall or surplus would be and at what period of time, whether in the mid-nineties, after the year 2000. And I guess I am correct when I say that you share my concern that the ATF will not proceed exactly on schedule, given the history of other aircraft we have seen introduced in the last 20 to 30 years?

Admiral DUNN. I have no reason at this time to believe that there is going to be any delay in the advent of the Navy variant of the Advanced Tactical Fighter. However, as you suggest, based on our experience with other development programs and our experience trying to take an Air Force aircraft and develop it into the Navy variant, I would not be surprised to see a slip in that program.

V-22 OSPREY

Senator MCCAIN. Do you see the Osprey having a use by naval air as well as marine air?

Admiral DUNN. Yes, a limited use for naval air for the V-22 Osprey. We see a use for combat search and rescue. In fact, we had planned to procure some for combat search and rescue.

We also see a use of the V-22 in a carrier onboard delivery role.

Senator **McCain**. A lot of us on the committee feel that this is not unlike the Harrier flight that we went through about 10 years ago that you might remember. And many of us are supportive of the Osprey because we feel that one strength that our military has is technology and the ability to advance technology-wise.

Many of us view the Osprey as exactly that, and including it having some commercial application over time. And I wonder if you could perhaps illuminate us on why the Marine Corps feels so strongly in one direction and the Navy seems to feel so strongly in the other?

Admiral **Dunn**. I believe, Senator, that the CNO has supported, in the past has supported the Osprey program as the needed replacement for the H–46 for medium lift in the Marine Corps. There is no divergence between the Navy and the Marines on that particular aspect.

The Marines need a replacement for the H–46, which is old. With this new technology they can get a replacement that will not only do the things the H–46 does now, but it will be more survivable. It will have a self-ferrying capability, be capable of launching over the horizon, and many other features as well.

Unfortunately, a decision was made not to include the V–22 in the 1990 budget, and that is a considerable chunk of the naval aviation program that was taken out. And while I support the Marines in the pursuit of the V–22 and I support the utilization of the V–22 in the Navy for the things I mentioned and later on in the civilian world, I am very fearful that somebody will want to reinsert the V–22 into the naval aviation budget at the expense of something I need more at this time.

Senator **McCain**. Thank you.

Mr. Chairman, I had several questions and answers that I had got from the Navy that I would request be made part of the record.

Senator **Kennedy**. They will be made part of the record.

[Questions sent to the Navy prior to the hearing with answers supplied follow:]

Questions Submitted by Senator John McCain

TRADE-OFFS BETWEEN DECOMMISSIONING THE U.S.S. MIDWAY AND THE U.S.S. ENTERPRISE

Senator **McCain**. Compute the life cycle costs out for 20 years for USS *Midway* and USS *Enterprise* beyond the USS *Enterprise* refueling overhaul (1995–2015). Assume that *Midway* will be of the same capabilities as *Enterprise*.

Navy Response. It should be noted up front that retaining *Midway* in service for another 20 years is not considered feasible nor can *Midway* be brought up to the same capability as *Enterprise*. The life cycle costs for fiscal years 1995–2015 are estimated to be (Then year $ in millions):

	Midway	Enterprise
Manpower	3,302	3,682
Ship operations	776	648
Depot maintenance	3,461	3,535
Total	7,539	7,865

The analysis was developed using a fiscal year 1990 base with a 4 percent inflation factor applied through the year 2015. The costs for Manpower and Ship Operations should remain relatively constant, if *Midway* fuel oil costs were to remain stable. The maintenance costs for *Midway* grow significantly over time as she ages and requires new engines, etc. The *Midway* costs are partially offset by the ultimate cost to deactivate and dispose of *Enterprise* which is included in the above analysis.

To continue *Midway* in service through fiscal year 1997 and beyond will require the blister modification ($40 million) and upgrade of the combat system ($28 million) before fiscal year 1995. *Midway* does not have the growth margin to support F–14s, S–3s and follow-on aircraft like the A–12 and ATF. Over time *Midway* will become obsolete in her ability to support even a modified airwing and will slowly lag behind the other carriers in modernization and combat capabilities as she would be 60 years old in 2005. *Enterprise* in 2005 will have used only one-half of her fuel and will support all aircraft and weapons improvements.

Senator McCAIN. Can a side-by-side comparison of the *Enterprise* and *Midway* operating capabilities be provided?

NAVY RESPONSE. An operating capabilities comparison of *Enterprise* and *Midway* follows:

	Enterprise CVN-65	Midway CV-41
Present age	28	44
Displacement (full load tons)	90,970	69,800
Length overall (feet)	1,101	977
Width overall (feet)	252	243
Range/endurance (in nautical miles):		
(at 15 knots)	(1)	15,000
(at 20 knots)	(1)	11,210
(at 30 knots)	(1)	4,550
Flight operations:		
(JP5 quantity) (days)	19–21	7–10
Ordnance:		
(capacity) (in cubic feet)	330k	140k
(tonnage)	2,524	1,210
Sealift support		(2)
War fighting:		
Catapults	4	2
Jet blast deflectors:		
(Mk 7/36′×11′)	2	
(Mk 6/42′×7′)	2	
(Mk 4/24′×7′)		2
Arresting gear (+ barricade)	5	4
Aircraft:		
(max density based on the A–7 acft footprint)	154	114
(equivalent airwing acft)	86	66
Aircraft elevators	4	3
Hangar bays:		
(Number)	3	2
(Length feet)	860	692
(Width feet)	107	85
(Height feet)	25	17.5
Weapons elevators	17	12
JP5 (GAL—millions)	2.9	1.2
Acft refuel station hoses:		
(Flt deck)	68	34
(Hangar deck)	28	12
DFM (GAL—millions)	NA	2.3
Air defense:		
(NATO Sea Sparrow)	2	
(Basic point defense msl sys)		2
(CIWS)	3	2

(1) Unlimited.

(2) More frequent JP5 and DFM (see capacities).

U.S.S. *Enterprise* is the more operational capable ship. Her greater mobility, sustainability, logistical self sufficiency and war fighting advantages, make her a more attractive option when compared to U.S.S. *Midway*.

Performing the refueling overhaul makes good sense when compared to retaining the older oil-fired *Midway* since *Enterprise:* is 16 years younger, will have 20 years additional fuel, has essentially unlimited, high speed endurance, carries 30% more and newer aircraft, contains 50% more aviation fuel, and, 50% more munitions capacity.

Refueling *Enterprise* provides fuel for approximately 20 years of operations. As with all nuclear powered aircraft carriers, she will have on hand nuclear fuel for virtually unlimited sustained power at high speeds, free from dependence on propulsion fuel support.

Retiring *Enterprise* now would be extremely wasteful because it would: lay up a nuclear powered aircraft carrier that has forty percent of her life left, not use the *Enterprise* unique replacement reactor cores already purchased and on hand (equivalent to about $550M in fuel oil).

The following is a summary of the capability advantages *Enterprise* enjoys over *Midway:*

Power Plant: A highly capable, already paid for, nuclear propulsion plant and fuel for approximately 20 additional years of operations. Virtually unlimited range and endurance at any operating speed.

Catapults: Four catapults vice the two on *Midway,* provide increased flexibility in aircraft operations and a vital redundancy in equipment in the event of damage or failure.

Aircraft Elevators: The four large elevators on *Enterprise* vice the three smaller ones on *Midway,* can handle any aircraft in the current and future inventory increasing flight and hangar deck efficiency and effectiveness.

Airwing: The size of a ship's flight and hangar decks determines the number and composition of aircraft complement. *Enterprise* has the capability to carry a complement of 20 more aircraft on board than *Midway* and will be able to fully support all of the Navy's latest aircraft. *Midway's* current configuration does not fully support F-14's or fixed-wing ASW capability nor does she have the growth capability to be able to support the aircraft of the future, such as the A-12 and the ATF.

Ordnance and Fuel (JP-5): *Enterprise's* greater JP-5 aviation fuel, storage capability, and weapons loadout provides a greater range of operations, sortie generation, targeting options, and overall flexibility. This is further enhanced by the tactical flexibility afforded by nuclear propulsion.

Seakeeping: The larger sized deck and greater hull displacement of *Enterprise* provides an inherent increase in safe flight operations and aircraft handling due to the ship's better seahandling stability in foul weather and higher sea states.

Senator McCAIN. Can a comparison of the historical operating costs of U.S.S. *Enterprise* and U.S.S. *Midway* be provided?

NAVY RESPONSE. A comparison of the historical operating costs for *Enterprise* and *Midway* is difficult because of the differences between the two ships. However, from fiscal year 1981 to fiscal year 1987, it cost an average of about 9 percent ($175M vice $162M per year in constant fiscal year 1988 dollars) more to operate and maintain *Enterprise* than *Midway.* The increased operating costs of *Enterprise* are associated with: larger size ship and airwing crew complement, differences between nuclear powered and fossil fuel propulsion support requirements, different maintenance strategy (phased maintenance on *Midway* versus SRA/COH/RF for *Enterprise,* and, the dollar overseas exchange rate as it applies to *Midway* in her Japanese homeport.

However, the substantially greater tactical warfighting advantages of *Enterprise* justify her slightly increased operating costs.

Senator McCAIN. What is the growth potential of *Enterprise* compared with *Midway*?

NAVY RESPONSE. *Enterprise* is, and will be, more capable of satisfying all current and future operational requirements than *Midway.* She can handle all current inventory and will be modernized during her overhaul to fully support all future tactical aircraft projections through 2015. Her combat suite will include the latest in electronics, command and control, communications, weapons handling and safety upgrades, improved habitability and work areas, aircraft launch and recovery systems upgrades. As can be seen from the data below *Enterprise* can accommodate more growth than *Midway.*

Volume: *Enterprise* greater size, including the additional 03 level below the flight deck, equates to over a million cubic feet of volume that *Midway* does not have.

Speed: *Enterprise* has sufficient propulsion power to accommodate any increase in displacement and still meet speed requirements; *Midway* has no margin for additional growth and now just makes speed requirements.

Electrical power: *Enterprise* has 2 to 3 times expected growth requirement with 20,000 kilowatts (kw) capacity. *Midway* is on the margin now with 11,000 kw and can only be upgraded to 12,000 kw.

Hull strength: *Enterprise* was constructed with greater structural strength because of the nuclear plant weight distribution requirements that the conventional ships do not have. Hull strength is a measure of the ship's ability to absorb additional weight, growth, and sustain battle damage.

CVN-65: max load, hull strength limit 123,450 tons.

CV-41: max load, hull strength limit 74,600 tons.

Reliability and redundancy: *Enterprise* has eight interconnected reactor plants and four interconnected propulsion plants to provide extremely reliable and flexible propulsion.

Again it must be stressed that *Enterprise* can accommodate and support the aircraft of the future (A-12 and ATF).

Senator McCAIN. Will the refuelings and overhauls of the *Nimitz* class aircraft carriers be as expensive and as extensive as the planned refueling/overhaul of the *Enterprise*?

NAVY RESPONSE. Refuelings and overhauls of the *Nimitz* class are expected to be less expensive than *Enterprise*. The following factors affect refueling/overhaul costs:

The age of the *Nimitz* class carriers at the time of their refuelings will be in the 18-20 year range as opposed to the 30 year old *Enterprise*.

The *Nimitz* class has two reactor plants compared with eight on the *Enterprise*.

Enterprise being the first of the "heel to toe" refuelings, will help defray some of the start up costs of the *Nimitz* class refueling production line.

Since there is a *Nimitz* class family of ships with similar reactor plants, sequential refueling/overhauls will allow for a more economical refueling process.

The fact that the production line for the *Nimitz* class reactor plant is still open means that parts can be procured for a lower cost, rather than costs associated with the manufacturing unique components.

Senator McCAIN. What are the defueling and disposal costs for *Enterprise*?

NAVY RESPONSE. Deactivation and disposal of her reactor components and hull are equal to about half the cost of the remaining refueling overhaul cost.

Since no nuclear powered surface ship has been retired and because the Navy has not been planning to inactivate *Enterprise* in the near future, formal shipyard engineering plans and cost estimates are not available. Her refueling and overhaul (RF/COH) will avoid the near-term cost of decommissioning the ship. Moreover, refueling and overhauling *Enterprise* will ensure that the more than $465 million already appropriated for advance planning and material procurement for *Enterprise* will not be wasted, irretrievably lost without benefit to the Nation.

Senator McCAIN. What is the value of fuel oil required for a conventionally powered aircraft carrier to steam an equal number of miles as U.S.S. *Enterprise* after refueling? What factors are included in the calculation?

NAVY RESPONSE. The current value of the fuel oil required for a conventionally powered aircraft carrier to steam an equal number of miles as the U.S.S. *Enterprise* after refueling is approximately $550M. When considering that the remaining investment costs for both phases of her refueling and overhaul are less than $1.5B, the fuel oil cost savings that accrue are equal to more than one third of the remaining cost of the refueling and overhaul.

The calculation of the above figure is based on a 1988 cost of the fuel, plus delivery, handling, and storage costs resulting in a total cost of about $50/bbl. The total number of miles the ship can steam on the new nuclear fuel cores at 20 knots equates to approximately 11M bbls of fuel for a conventionally powered aircraft carrier at the same speed. It must also be remembered that the price paid for the nuclear fuel is a fixed price at the time of procurement, the cost of fuel oil will vary as world markets dictate.

USS ENTERPRISE (CVN-65)...

MAXIMIZING THE RETURN ON THE TAXPAYERS INVESTMENT

INTRODUCTION

- What is the President's program for USS ENTERPRISE (CVN-65)?
- What are the real costs and schedule for CVN-65's refueling and overhaul?
- Why is it necessary to carry out this program? Are there any alternatives? What are the implications for the Nation if this program is not undertaken?
- The program to refuel and modernize CVN-65 is the "Best Bargain Around" for maintaining our Carrier Battle Groups. Moreover, this initiative makes use of an existing fleet asset, which from any perspective makes good business sense in today's tight fiscal environment.

ENTERPRISE

CHARACTERISTICS AND CAPABILITIES

Displacement: 73,500 tons light, 90,970 tons full load

Dimensions: Length and beam at waterline are 1,040 ft and 133 ft, respectively
Flight deck is 1,101 ft long and 252 ft wide
Hangar deck is 860 ft long, 107 ft wide, and 25 ft high
Draft is 39 ft

Crew: Manning 3,208 (172 Officers + 3,036 Enlisted)
Air wing 2,092 (290 Officers + 1,802 Enlisted)

Propulsion: 4 steam turbines; 4 shafts

Reactors: 8 pressurized-water (A2W)

Performance: Speed 30+ knots
Endurance approximately 20 years on new cores

Combat System: Modern Carrier Air Wing

CVN -65

RF / COH STRATEGY

- Two-phase program to ensure a modernized nuclear-powered ship with about 20 years of fuel for continued operations
- Phase I -- January 1991 - August 1993
  - Reactor plant refueling and reactor/propulsion plant repairs
  - Overhaul will include all propulsion plant work and limited topside work
  - Modernization will be focused on reactor/propulsion plant maintainability, and navigation and communications systems
- Phase II -- 1993 - 1994
  - Focus on topside modernization and non-propulsion system repairs
- Total cost for both phases is estimated to be less than $2 billion.

PHASE I WHAT GETS DONE

- **Reactor plant refueling**
  - **Remove all existing nuclear fuel**
  - **Install new nuclear fuel power units**
- **Reactor plant overhaul**
  - **Repair/replace reactor plant valves/piping, clean steam generators**
  - **Replace reactor rod control system and instrumentation**
- **Non-nuclear repairs/modernization**
  - **Aviation Support: Catapults, arresting gear, blast deflectors, F/A-18 support modifications**
  - **Command, Control and Communications: Naval Tactical Data System and ASW Module upgrade (prepare space for Phase II program)**
  - **Weapons: Start weapons elevator and magazine upgrades, extend two weapons elevators, upgrade Close-In-Weapon-System (CIWS)**
  - **Other Modernization/Repairs: Overhaul electrical system, install state-of-the-art sewage system, increase air conditioning capacity, Halon fire-suppression system in machinery spaces, repair propulsion auxiliaries, hull maintenance and refurbishment**

CVN-65 BUDGET REQUEST

	Total Costs (millions of then-year dollars)			
Area of Work	**Prior FY**	**FY 1990**	**FY 1991**	**Total**
Reactor Plant (Nuclear)				
- Refueling/Plant Overhaul	152.0	55.9	-	207.9
- Reactor Plant GFE	250.0	-	-	250.0
- Execution	-	40.1	519.0	559.1
<Subtotal>	<402.0>	<96.0>	<519.0>	<1017.0>
Balance Work (Non-Nuclear)				
- Repairs	21.8	5.3	261.2	288.3
- Modernization	11.0	4.7	60.3	76.0
- GFE	30.5	23.1	26.4	80.0
<Subtotal>	<63.3>	<33.1>	<347.9>	<444.3>
Total Phase I Costs	465.3	129.1	866.9	1461.3

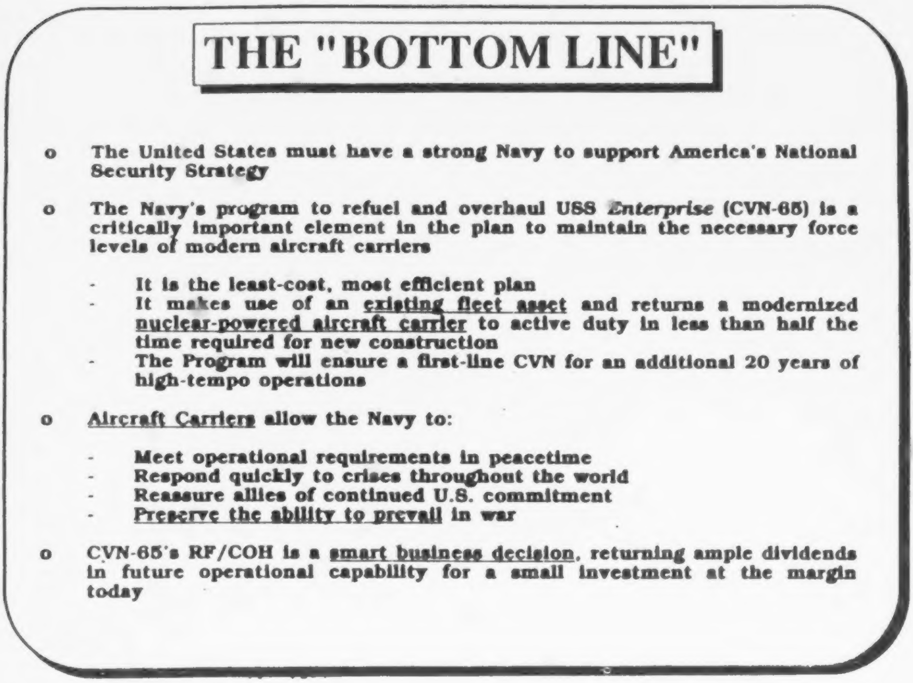
OUT-YEAR EFFORTS

DELIVER A CAPABLE CVN

- Non-Propulsion Repairs/Modernization
  - Aviation Support: F/A-18 maintenance support facilities, updated carrier landing system radar
  - Command, Control and Communications: Install Naval Tactical Data System and ASW module upgrades, Target Acquisition System
  - Weapons: Complete weapons elevator and magazine upgrades, weapons elevator extension, CIWS update
  - Other Repairs/Modernization: Improve ventilation and air-conditioning distribution systems, complete air conditioning capacity upgrade, habitability upgrades, Interior Communication System repairs, non-propulsion auxiliaries, C3 repairs, catapult and arresting gear support systems, weapons systems/elevators, combat systems
- Budget-quality cost estimates for Phase II will be developed as part of the work definition process

A WELL STRUCTURED PROGRAM TO SUSTAIN OUR CVBGs

- CVN-65 RF/COH is an integral part of overall Navy management plan to maintain our deployable carriers
  - Complex Overhaul
  - Service Life Extension Program
  - Nuclear Refueling
  - New Construction
- This new-construction/maintenance program will minimize burdens on:
  - Operational Tempo -- Maintain material readiness
  - Personnel Tempo -- Keep retention high
  - Shipyard Facilities -- Preserve core workforce efficiently
- The program balances operational needs with fiscal realities, and does so in the most affordable, efficient, and effective manner possible
- There are no practical alternatives to CVN-65's RF/COH program that will enable the Navy to maintain the CVBG force level
- New-construction carrier really not feasible because of cost, shipyard facilities constraints, and long construction period



THE "BOTTOM LINE"

- The United States must have a strong Navy to support America's National Security Strategy
- The Navy's program to refuel and overhaul USS *Enterprise* (CVN-65) is a critically important element in the plan to maintain the necessary force levels of modern aircraft carriers
  - It is the least-cost, most efficient plan
  - It makes use of an existing fleet asset and returns a modernized nuclear-powered aircraft carrier to active duty in less than half the time required for new construction
  - The Program will ensure a first-line CVN for an additional 20 years of high-tempo operations
- Aircraft Carriers allow the Navy to:
  - Meet operational requirements in peacetime
  - Respond quickly to crises throughout the world
  - Reassure allies of continued U.S. commitment
  - Preserve the ability to prevail in war
- CVN-65's RF/COH is a smart business decision, returning ample dividends in future operational capability for a small investment at the margin today

U.S. CARRIER FORCES

Senator McCain. What is the contingency value of the CVBG in a crisis/low intensity conflict?

Navy Response. The record is absolutely clear: Carrier battle groups (CVBG) are the primary U.S. military force used to respond to regional crisis/low intensity conflicts.

In the past 45 years, naval forces have been called on in over 80 percent of the crises to which our military has responded.

The reason is simple. Carrier battle groups offer a degree of flexibility that no other national asset can match. They can make their presence known, remain as long as needed, respond with the appropriate degree of force from multiple axis of attack, and then sail away without signalling retreat when tensions subside.

A few recent examples include the operations in support of the peacekeeping mission in Lebanon, capture of the Achille Lauro hijackers, retaliation against Libya for the Berlin disco bombing, Grenada, support for Korea during the Summer Olympics and the Persian Gulf operations.

CVBGs operating in forward deployed crisis areas provide a wide range of military options unrestricted by the limitations inherent in land based forces. These capabilities include providing military presence, forward surveillance, demonstrating a show of force and national resolve, or conducting actual combat operations.

With sea based air power, we can take military action without needlessly drawing friendly nations into crisis with their neighbors as may be the case when land based air forces are used.

During the Korean and Vietnam conflicts, our carrier forces operating secure at sea were able to engage enemy forces, deliver ordnance on target, and protect our land forces even as land based airfields were overrun and made unusable.

Equally significant, but difficult to quantify, is the lack of conflict in troubled areas which has resulted from the steady presence off-shore of our carrier battle groups.

Senator McCain. What are the problems associated with overseas basing beyond numerical decline? What can we anticipate in the near and long terms in the Philippines, Mediterranean, and Persian Gulf? Provide illustrative examples of those situations when CVBGs can provide the only method of basing for power projection.

Navy Response. The United States has experienced a gradual decline in the number and location of overseas bases and has found it increasingly costly to maintain existing base and access arrangements.

Reduction in our base structure has been a result of both host nation and domestic initiatives. We are gradually increasing reliance on fewer facilities. Further losses will be difficult to absorb without affecting the ability to operate in some regions.

The effect of loss of access or freedom to operate from certain facilities will vary by region, mission performed, and availability of alternative arrangements.

Even in some places where our presence is welcomed, we have experienced a loss in freedom of action; nuclear-capable forces in particular have been constrained. This may have as much impact on our ability to support certain operations as outright access termination.

Many nations are coming to view basing and access arrangement as primarily or exclusively serving United States interests. The issue of infringement on territorial sovereignty is a primary concern. Additionally, nations fear being associated with or being dragged into conflicts by the United States against their will.

Intensifying nationalism and the perception of a declining Soviet threat will fuel pressure to reduce U.S. overseas bases.

Base negotiations can be expected to be protracted, contentious, and may impact relations in other areas. While compensation often serves to assuage objection, if the host nation feels it is undercompensated, the issue becomes in itself a source of friction and resentment. If the compensation is excessive, it will fuel domestic desires to reduce overseas basing. The difficult, yet ultimately successful base negotiation in one country may encourage another to increase its demands on the U.S.

Domestic concerns primarily are the cost of access agreements (often viewed simply as "blackmail"); the vulnerability of U.S. forces overseas; the lack of equal burdensharing by many allies; and a questioning of the need for the United States to be the "policeman of the world".

In case of a global Soviet war, base access will be significantly better than that available to meet low intensity or regional conflicts. The Soviet Union by virtue of its geographic position is less dependent on foreign bases than the United States. Therefore, it is in the interest of the Soviet Union to pursue policies which reduce our overseas basing network. This will be a concern in negotiating an arms control agreement.

In wartime, dependence on vulnerable land bases may cripple our warfighting ability. For example, during the Korean War all in-country air bases were overrun by the enemy. During the Vietnam war enemy action repeatedly shut down key land bases. In contrast sea-based forces were never seriously threatened by enemy action. Additionally, with the fall of Vietnam, considerable base investments were forfeitured. These same investments now support the military of Vietnam and the Soviet Union. The same thing happened in Libya and Iran when we were expelled.

Philippines: The term of the current base agreement becomes indefinite in September 1991 and the GOP will likely give notice to terminate the agreement in order to negotiate a new treaty. Issues of increased compensation, sovereignty over the bases, criminal jurisdiction over U.S. servicemembers, consent for unilateral U.S. military operations from bases, and the presence of nuclear-capable ships and aircraft on Philippine soil are likely.

Spain: In addition to recent base closures, the U.S. has experienced reduced control over remaining bases, loss of some jurisdiction over U.S. personnel, and less control of base related construction/maintenance.

Greece: The Greek government is pressing for the closure of the U.S. airbase at Hellenikon, and has indicated that if a new agreement on the remaining bases is not reached, then all U.S. forces must begin withdrawing according to the 17-month timetable as specified in the expired agreement.

Turkey and Portugal: Both have indicated that they will significantly raise the cost for continued access to bases on their territory.

Persian Gulf: The United States already is constrained in base access to this vital region. Reasons for the lack of base access include nationalistic sentiment, pan-Arabism, Islamic fundamentalism, sensitivity about colonial past, U.S. support for Israel, and in some cases ideological differences. While recent U.S. diplomatic and military actions in the region have enhanced our influence in the region, this has not translated into greater land base access. Our military presence and combat capability remain centered around our forces at sea.

Conducting sustained power projection operations throughout the world in the future will require carrier based air. This is because the most crisis prone areas do not have viable land base access to sustain operations for a protracted period. In short, sea-based naval air forces, particularly naval air forces, are the only available choice.

Senator McCain. Provide insight into the shortage of escorts for 15 CVBGs. How we expect this problem to be managed, i.e., NATO support, the decreased requirement of escorts involved with multi-battle group operations, peacetime deployment flexibility?

Navy Response. Issues of combatant shortages to support our CVBG forces will be addressed concurrently with a review of carrier uses, commitments, and National Strategy now being conducted by JCS. Following evaluation of those results additional information can be provided.

Senator McCain. Can Navy provide all the aircraft of all types necessary for mission effectiveness now and for the next 10 years?

Navy Response. The Navy remains committed to 13 active Carrier Air Wings (CVW) and 2 Reserve CVWs to carry out the tasking of this country. We are carefully managing the TACAIR/ASW CV aircraft resources to support our carrier battle groups.

Bottom line is we have the aircraft needed and are programming for their upgrades and replacements. We are managing them to have adequate numbers and mixes to man the carrier air wings.

Inventory projections are based on current ABS APN. Aircraft deliveries are projected two years after procurement, therefore accurate inventory projections can only be provided through fiscal year 1996.

There are currently four separate types of Navy carrier air wings (CVWs). Each CVW is structured for the specific size and type aircraft carrier to which it is assigned.

Aircraft shortfalls will continue to be managed by proven initiatives such as air wing composition changes, delays or cancellations of new programs, pipeline reductions, operational crossdecking, and/or service life extension programs. Although these options are not desirable, they are considered a manageable risk in the current political and fiscal environment.

Senator McCain. How will Navy fund suitable naval air modernization over the next 10 years. Explicitly address the problems inherent in the A-6 program, F-14 modernization, and ATA costs.

Navy Response. The Naval Plan is designed to build a force mix of 13 Active and two Reserve air wings as well as funding for three Active and one Reserve Marine Corps wings. The Amended Budget Submission (ABS) recognizes the required maintenance and modernization of the carrier air wings.

We are moving forward on the A-12 ATA as our top naval aviation priority—we are in cooperative development of the A-12 with the Air Force in defining the Air Force ATA variant as well as cooperative development on the Advanced Tactical Fighter (ATF).

The A-12 is programmed to be a one-for-one replacement of the A-6 aircraft. The A-6 SWIP is capable of meeting the current threat; however, as the threat increases through the mid-90s, the A-6 will become progressively less capable of accomplishing its land-attack role. The A-12 will then carry on in that role.

The F-14 modernization will continue as a remanufacture program with a full F-14D force by the year 2000, by which time a follow-on aircraft is fully defined. The remanufacture program, along with improved mission avionics, radars, airframe components, and engines, provides for the best capability.

Our concern is speed of modernization versus acceptable risk levels. We feel that the level of risk is acceptable at this time. Our aviation plan is currently balanced among warfighting requirements. Given the current economic climate, threat assessment and risk analysis, our plan is sound and executable.

Senator McCain. How do you justify Surface (Battleship) Action Groups (SAGs)? How are they to be used in wartime and peacetime? If a SAG can substitue for a CVBG, include examples.

Navy Response. Carrier and Battleship Battle Groups have differing strengths which when properly applied contribute to wartime and peacetime missions. The heavy armor protection, Tomahawk cruise missiles, main gun batteries and Remotely Piloted Vehicle of the modern battleship are demonstrated capabilities which complement those of Carrier Battle Groups. BBBGs can provide adequate combat capability in many key regions where the AAW and ASW threat is with the defensive capabilities of the battle group and free CVBGs for operations in more demanding theaters.

During hostilities Battleship Battle Groups will be utilized in regions where a naval presence will be required to counter and deter Soviet client or other opportunistic states, thus freeing carriers for execution of operations elsewhere.

Probable Atlantic fleet wartime operating areas include the Caribbean and Mediterranean Seas. Probable Pacific fleet wartime operating areas include the waters off Vietnam and North Korea. Operations in the North Atlantic, North Pacific or Indian Ocean may be undertaken as necessary.

In peacetime, Battleship Battle Groups are effectively used to complement Carrier Battle Group deployments and provide a force multiplier when executing contingency operations. For example:

In 1983/84, off the coast of Lebanon, U.S.S. *New Jersey* conducted operations in support of forces ashore.

In 1986/87, U.S.S. *New Jersey* provided battle group presence in the North Pacific during U.S.S. *Midway's* backfit for F/A-18 aircraft.

In 1987/88, U.S.S. *Missouri* and U.S.S. *Iowa* participated in reflagged convoy missions in the Strait of Hormuz.

Senator McCain. What are the strengths and weaknesses associated with the substitution of SLCMs for Carrier Strike Assets Similarly, how can SLCMs supplement Carrier assets?

Navy Response. The desire to reduce loss of life when the United States conducts military actions has focused attention on high-tech stand-off systems such as SLCM. These systems are also seen as a means of reducing force attrition and avoiding "captured pilot" scenarios.

Given the reality of reduced fiscal resources for defense, some view SLCMs as capable of accomplishing not only the tactical mission for which they were designed, but also as a means for replacing multi-mission carriers thus reducing manpower costs. This rationale is incorrect in that it makes the assumption that SLCMs can fully substitute for carrier aircraft.

The SLCM must be viewed as one rung on the ladder of maritime power projection options. It is an accurate, unmanned, pre-programmed, small payload weapon and a force multiplier which supplements the capabilities of carrier strike aircraft, surface combatants and submarines thereby contributing to the Navy's aggregate power projection ability.

Carrier aircraft provide an accurate and versatile, manned and therefore flexible, heavy payload weapon capability. Many targets require the heavy payload and versatility found only in manned aircraft.

As superficially attractive as SLCM tradeoffs for carrier-based aircraft assets may appear, the total capabilities of the carrier (indeed the CVBG) must be weighed—power projection, deterrence and warfighting roles. Mobility, responsiveness and flexibility are inherent requirements for the successful application of naval force. A balanced and proportional mix of naval power projection assets as currently planned will enable the Navy to support our national security strategy and respond to threats to U.S. interests worldwide as directed by the NCA.

Senator McCain. Provide information on the aircraft carrier nuclear refueling program and illustrate the nuclear refueling program and its impact on carrier requirements.

Navy Response. Starting in fiscal year 1991 with U.S.S. *Enterprise* the Navy will begin "heel to toe" refueling of the nuclear aircraft carrier force that will continue well into the 21st century.

The following is a national timeline for the refueling of nuclear aircraft carriers. The duration of the availability, except for U.S.S. *Enterprise*, is an estimate, since we have not refueled a *Nimitz* class aircraft carrier. Additionally, the actual refueling overhaul start may be changed based on depletion of the reactors from utilization and other factors.

Fiscal year—				
90 91 92 93	94 95 96	97 98 99	00 01 02 03	04 05
CVN-65	CVN-68	CVN-69	CVN-70	CVN-71

At this time it is impossible to quantify the impact on carrier requirements with certainty. On January 31, 1989, CNO wrote the following to Senator Warner:

"We have no experience base to tell us how soon, or at what point, we could return these ships rapidly to service to meet emerging national requirements. At this time, I can't say we should consider them 'non-deployable' for a designated period of time, place them in a "SLEP' status, or state that we need additional carriers to cover our mission requirements. Such a decision depends on the international situation, the THREAT, on imposed fiscal constraints, and, upon the level of risk our country is willing to accept as it strives to ensure our national survival."

Senator McCain. What are the personnel and O&MN problems inherent with not having adequate numbers of carriers?

Navy Response. The definitive impacts on manpower and O&MN funding cannot be quantified at this time. The Presidentially directed National Strategy Review is nearing completion and may change the strategic requirements. Today, the Navy is not meeting the required presence of 2 aircraft carriers in the Med with the current force structure, but is maintaining a 1.2 presence.

Senator McCain. What is the marginal saving that accrues from retiring two older carriers? What are the savings associated with a parallel downsizing of escorts and airwings?

Navy Response. The following is the marginal savings in O&MN and manpower achieved by the early retirement of U.S.S. *Coral Sea* and U.S.S. *Midway* as presented in the fiscal year 1990/1991 Amended Budget Submission:

[Dollars in millions]

	Fiscal year—				
	1990	1991	1992	1993	1994
Coral Sea:					
O&MN	35.6	67.5	99.9		
MPN	17.7	39.1	23.4		
Total	53.3	106.6	123.3		
Midway:					
O&MN			32.1	32.8	63.2
MPN			41.2	92.0	94.0
Total			73.3	124.8	157.2

The requirement for airwings remains unchanged as presented in the fiscal year 1990/1991 Amended Budget Submission as new carriers replace the retiring carriers, and the surface force has been presented as a balanced force structure.

Senator McCain. Thank you.

Senator Kennedy. Senator Wilson.

Senator Wilson. Thank you, Mr. Chairman, and thank you for the courtesy of sitting with the subcommittee.

Admiral Dunn, you made a very compelling argument on your statement for the case for the utility of the carrier battle groups in the context of our announced strategy of forward deployment. You made much of the mobility and the fact that we are today in possession of carriers that were constructed at the same time that we constructed bases that are no longer in our hands.

Let me just say that I accept all of that and think that the Nation has been very well served by those carrier battle groups. The question I have is that we are no longer—I do not think it is a question in dispute as to the utility of the battle groups.

CURRENT OPERATING TEMPO

The question is, given the competing claims, how many are we able to afford, and are there some alternative ways to discharge the obligation that we have, the mission, in meeting certain commitments that provide an alternative to going forward at least at this time?

Now, one of those, one of the arguments that you have made, is the fact that we are taking a very heavy toll on ships, on aircraft, and on personnel by operating at the current tempo. Is there some way that we can relax that operational tempo without continuing to take that toll and without in fact failing to discharge the obligation?

Are we perhaps being too rigorous in terms of the current operating tempo.

Admiral DUNN. Senator, I hope I did not mislead you in my statement. We are not now overextending personnel. We are and have been for the last couple of years subscribing religiously to the CNO's and the Secretary of the Navy's and now Mr. Cheney's stated policy, stated rules about operational tempo and personnel tempo, cruises no longer than 6 months, and so forth.

But the thing is that if we have to continue meeting the same commitments we have been asked to meet and we have to continue to adhere to these personnel and operating limits and we do not have enough battle groups to do it, it will not work.

Something has got to give. So far we have said that what will give will be the meeting of the commitment. For example, we are required to keep two carriers in the Mediterranean. We do not keep two carriers in the Mediterranean and have not done so for some time. There is other commitments which we will miss by not being able to go 15.

That is a calculated risk that we are taking, but we are going to protect the people first.

LHA AND AV-8

Senator WILSON. This has already been touched on in the questioning by Senator Cohen, but without in an open session specifying what, if any, they may be, are there some of those obligations, some of those commitments, that could be met at least temporarily by the expedient of using, as I understand it, about half a dozen of the LHA's in a configured battle group that involves a battleship with AV-8-loaded LHA's?

I understand that they do not have the same capability as a large-deck carrier, that you cannot enjoy the same advantages that you outlined in terms of concentration of different types of aircraft and different types of ordnance. However, would this not give you a capability that at least in certain contexts might suffice?

You made a point, and I think quite reasonably, that the likely prospect of conflict in which we would have to project force may very well occur in a Third World context. Is it not possible for us to at least temporarily make use of a battleship with LHA and AV-8's as an alternative?

I see the microphone is being moved by the Secretary toward Admiral Nyquist.

Mr. PYATT. You mentioned battleships.

BATTLESHIP BATTLE GROUP

Admiral DUNN. I would like to have a crack at it first. First of all, the battleship, the battleship battle group, can be used in certain very limited contexts where air superiority is guaranteed through the availability of land/based air.

Some place, for example, in the Caribbean might apply. But we do not normally count the Caribbean deployment as one of those places where we have to keep our carriers when we are talking about commitments.

We can put AV-8's aboard LHA's, let us say, and we could use them to advantage in very limited scenarios. The example which came to mind when you were asking your question, Senator Wilson, was a ship the Spanish have now called the *Principita Storias*, a sea control ship. That ship is about the same size as an LHA. It has a ski jump ramp. It can carry 24 aircraft, a mixture of Helos and Harriers. The Spanish have the Harrier.

They elect to put eight Harriers on board. With eight Harriers on board, you would probably have six ready to fly at any one time, and if you wanted to keep around the clock protection or strike capability you would have three airborne at any one time.

That is not a very potent strike force, and I think that goes right to the heart of what a small carrier problem is all about. We have looked at it. We just do not think it is a good idea.

The Falklands experience has shown us that there is no substitute for a large deck aircraft carrier and the things that it can do.

But Admiral Nyquist, being the sponsor for battleships, might have a few good things to say about battleships.

Admiral NYQUIST. Senator Wilson, as I said at Admiral Dunn's farewell party the other night, I am a Dunn-trained man, and in truth I am. He taught me all I know about running battle groups.

But I agree with him completely about the battleship's role, and that was the role for which we brought it back, in those areas where you can send that kind of capability with the lesser kind of an air threat. I would only add to what Admiral Dunn said that any use of the LHA or that kind of ship in a role in that kind of sea control or projection role might well take it away from its principal role, its amphibious role.

You would have to have—the LHA being part of the amphibious ready group, you would then have that amphibious ready group in places where you might otherwise not have him, that is trying to substitute it for a carrier, for a carrier battle group.

Senator WILSON. What do we currently have, about half a dozen LHA's?

Admiral NYQUIST. Yes, sir, we have five.

Senator WILSON. Five.

Senator KENNEDY. If the Senator will yield just on this point.

Senator WILSON. Sure.

Senator KENNEDY. The issue was raised, as I understand it, where you could not and did not want to bring the aircraft carrier into the gulf. And you had some other, obviously, maneuverability issues at that time. When I was over there this matter was being discussed as having some capability or capacity to achieve some of the objectives. I am not sure, but at least that was an area which was under some consideration.

Senator WILSON. Yes. I was thinking of that, Senator Kennedy.

Also, you made the comment, Admiral Dunn, that the British experience in the Falklands indicated that it really is no substitute.

Senator WILSON. Could you enlarge on that a little bit? As I understand it, the British carriers that were involved there had only about half the flight—or they were at least half the tonnage. I do not know what the flight deck size was.

Admiral **Dunn**. Yes, sir. As I recall, they are larger than the *Principita Storias*.

Mr. **Pyatt**. I think they are about 20,000 tons.

Admiral **Dunn**. I think they were about 20,000 tons.

Senator **Wilson**. The LHA is about 40, is it not?

Admiral **Dunn**. Yes, sir, it is. But they had no airborne early warning, for example, such as the E-2C aircraft we carry on our large deck carriers. They did not have the kind of aircraft that can get out to provide fleet air defense, like the F-14 or even the F/A-18.

They had some Harriers and the Harriers had some radar, and the crews covered themselves with distinction as they attempted to defend that force. But they were unable to defend the force against a relatively unsophisticated air force.

The Argentines, too, were very dedicated aviators, flying the A-4 Skyhawk, which is an aircraft near and dear to my heart. And they went a long way toward—they stressed the Brits. But they would not have had any chance against a modern large carrier force.

Senator **Wilson**. The only other question I have, Mr. Chairman, relates to the *Enterprise* overhaul. That has been touched on. But could you elaborate a bit on what the sunk costs are that you referred to in your statement?

Mr. **Pyatt**. About half a billion in terms of refueling cores, the reactor components, planning, all those pieces.

Senator **Wilson**. Thank you.

Thank you, Mr. Chairman.

Senator **Kennedy**. Thank you.

Does it not basically get down to, with the *Enterprise,* where you have got half a billion in there, you are going to be half a billion to $600 million to close it down? That would be $1.1 billion. The best estimates are $2 billion for an extension of 20 years capability versus the $3.2 billion for 30 years. I think just ballpark figures.

Mr. **Pyatt**. Yes.

Senator **Kennedy**. I think if we get the figures in the shipbuilding account and we are able to review those and watch those carefully, obviously I think the Navy has a great interest because it is going to have follow-on with these other aircraft carriers down the road in any event with some more kinds of procedures.

So I think you are going to have a lot of pressure to make sure that you meet those requirements. It seems to me to make some sense.

I had some additional questions, just on the aircraft, but maybe I can submit those to you, along the lines of some of the other questions as well. But I will submit those for the record.

I do not know whether there are any other members who have questions, but we will submit them.

I want to thank you very much for both coming up here and the responsiveness. I have found it enormously informative and helpful, and I want to express our appreciation to all of you.

Mr. **Pyatt**. I would like to express our appreciation for your willingness to listen.

I would also like, if I may, to take a moment to introduce a man here who makes all this happen, the Program Manager for Aircraft

Carriers, Frank Holmes. He does all the work and puts up with all the agony of our battles, internal and external and contractors and Navy.

Senator KENNEDY. Let us get a good look at that fellow.

[Mr. Holmes stands.]

Mr. PYATT. Thank you, sir.

Senator KENNEDY. Thank you very much.

The committee stands in recess.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR EDWARD M. KENNEDY

F-14

Senator KENNEDY. The amended President's budget calls for termination of new production F-14D and relying exclusively on remanufactured early model F-14s.

Will the Navy be able to meet its inventory requirements if the F-14 new production is terminated?

When will the Navy have an aircraft shortfall and how will it deal with it?

Which is more important for the Navy—new production F-14s or remanufacturing F-14s?

Admiral DUNN. Without new production of the F-14D, the Navy will experience a fighter aircraft inventory shortfall commencing in 1995 which will grow to about 56 airplanes by the year 2000. The Navy will manage this shortfall by drawing airplanes from the pipeline, the FRS, and squadrons returning from deployment to ensure carriers deploy with two 10-plane squadrons. Since the remanufactured F-14D will have the same operational capability as the new F-14D, neither can be considered more important than the other.

T45TS

Senator KENNEDY. The amended budget calls for suspending procurement of T-45 trainers and delaying procurement for one year. Was the program cut back because of budget pressures or because of problems with the program? Are the problems with the T-45 so serious that we may never buy it or do you think you will be able to work out the difficulties?

Admiral DUNN. The amended budget removed fiscal year 1990 procurement and reduced fiscal year 1991, which will spread the prior year procurement deliveries over two years at the pilot production rate. The Navy prudently initiated the restructured program based on several factors including: late delivery of two flight test articles; delays in the flight test program; aircraft performance deficiencies found during initial developmental and operational flight testing; Navy estimates of the time to correct the deficiencies and implement the change in production aircraft while limiting expensive retrofit. Concurrent overall Navy budget reductions were also a factor.

Technical difficulties with the T-45 are undergoing engineering analysis by Douglas Aircraft and Navy engineers. All deficiencies are correctable and considered low technical risk. Progress has been made in correcting each deficiency, and McDonnell Douglas has pledged all corporate assets to rectify problem areas.

EA-6B

Senator KENNEDY. The amended budget calls for terminating further procurement of the EA-6B and moving strictly to a remanufacture program. Does the Navy expect to have an inventory shortfall of EA-6B's? How big a risk do we face if we terminate further procurement of new EA-6B's?

Admiral DUNN. The Naval Aviation Report (NAR) shows the Navy/USMC requirement for EA-6Bs is 147 aircraft in 13 Active and 2 Reserve Navy Airwings and 1 Active and 1 Reserve Marine squadron. With fiscal year 1989 as the last initial production year for EA-6Bs, the shortfall will be 21 aircraft in 1992 and will worsen each year due to attrition. By 1996, the shortage will be severe enough to require initiation of management actions such as squadron PAA reductions, remanufacture program restructure and/or asset reallocation among deploying units.

The associated risk is a function of actual attrition (presently predicted to be 3 percent per year), and the speed with which a replacement aircraft is fielded. The risk at this time is considered acceptable due to present budget constraints, however, there is little margin for contingency requirements.

MEDIUM ATTACK AIRCRAFT (A-6 AND A-12)

Senator KENNEDY. What is the Navy's plan to keep the A-6 fleet operational? Do you need to upgrade the radar? How much would the Navy be prepared to invest in keeping the A-6 fleet operational?

Admiral DUNN. The Navy is currently upgrading the A-6 fleet with SWIP Blk I and Blk II modifications. These upgrades will improve the aircraft's capability to launch standoff weapons and thereby increase its survivability and safety. The Navy is investigating the possibility of additional upgrades to the A-6E SWIP aircraft. Any upgrades developed will have to be balanced against other Navy requirements and available fiscal resources.

E-2C

Senator KENNEDY. Both the F-14D and the E-2 Navy AWACS aircraft are manufactured by Grumman. If the F-14D is terminated, the overhead costs will have to be carried by the E-2 program. If the F-14D new manufacture is terminated, is the multiyear procurement proposal for E-2s still executable? Is the budget request valid?

Admiral DUNN. The procurement proposal will still be executable in the event that the F-14D new procurement program is terminated. However, pending Grumman Corporate decisions the multiyear price may change.

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

F-14

Senator MCCAIN. In general terms, is it logical to say that the "life remaining" on a remanufactured aircraft would be approximately one-half that of a new aircraft?

Admiral DUNN. The F-14 airframe was designed for a-6,000 hour service life. The Navy currently expects the F-14 to operate to at least 7,500 hours and is continuing fatigue testing to further extend the service life as economically feasible. All remanufactured aircraft will have at least 3,000 hours of service life remaining.

Senator MCCAIN. When the new production F-14 aircraft in fiscal year 1990 budget were canceled, were dollar increases allowed for continued manufacture/remanufacture of other Grumman aircraft programs? How much will that add to the fiscal year 1990 budget for these programs?

Admiral DUNN. Dollar increases for Grumman programs other than the F-14D were not considered. The full impact of this decision on these programs will not be known until Grumman completes reorganization and business base adjustments.

Senator MCCAIN. With the cancellation of the F-14 new production, can Grumman remain in the Naval aircraft business?

Admiral DUNN. Grumman has stated that cancellation of the F-14D new production will force a major internal reorganization in order to remain in the naval aircraft business. The potential for success of that reorganization is not known.

Senator MCCAIN. What is the up-to-date forecast on F-14 "shortfall" in fiscal year 1995-2000 and fiscal year 2005?

Admiral DUNN. The Navy expects a shortfall of about 56 F-14 airplanes by the year 2000 and 235 by 2005. The early shortages will be managed from pipeline and shore-based assets. The NATF should compensate for the later shortages.

Senator MCCAIN. Do I understand that to acquire 12 new production F-14D aircraft in the fiscal year 1990 budget, we would have to only add $365M (a marginal cost of $30.5M each)?

Admiral DUNN. That is correct.

F-14D

Senator MCCAIN. Admiral Dunn, since you are leaving the Navy this month you should be able to speak freely. In your personal and professional opinion, what should be done with the F-14D program?

Admiral DUNN. In an unconstrained budget, the optimum decision would be to continue new F-14D production until the follow-on aircraft was firmly in development and plan production shutdown to minimize termination costs as well as avoid fighter aircraft shortages. This amended budget answers the call for deficit reduction and naturally entails some risks with regard to carrier based fighter aircraft.

Both the Secretary of Defense and the President were apprised of those risks before the budget was submitted and those risks were considered acceptable in the current world political and fiscal climate.

F-14

Senator McCain. Is it true that remanufacture of F-14 aircraft will not provide any relief to the F-14 program "shortfall"?

Admiral Dunn. That is true. Attrition runs about 9-10 airplanes per year. Airframe retirements are expected to commence in the year 2001. Only new production can replace lost airframes.

Senator McCain. I have been advised that with no new F-14 production, the Navy could be short 200 F-14 aircraft by the year 2002. The inventory requirement of F-14's is about 470 units, so you would be down to nearly half strength. Yet the N.A.T.F. is not supposed to be ready for fleet introduction until that time or later, and by the time a reasonable number of NATF's are deployed properly it will be at least the year 2005. Is that a calculated risk the Navy must take to be at one-half strength of their prime weapon system?

Admiral Dunn. Without new production, the Navy could be short approximately 91 aircraft by the year 2002 against an inventory requirement of 458. At this time, the risk is considered acceptable and the NATF should be ready in time to make up for that shortfall.

Senator McCain. I notice in all of our overseas crisis situations the first of our armed services called upon is the Navy Carrier Force, and the weapons systems the Task Force Commanders use are always the F-14's and A-6's. Why then are we stopping both of these production lines before the replacement aircraft are built and proven?

Admiral Dunn. The principal reason for terminating production of both the F-14 and A-6 is affordability. The current fiscal climate has necessitated some tough decisions. Neither program was truncated blindly. The F-14 inventory is sufficient to meet our needs until the NATF comes on line. The A-6 inventory is not as well off but the introduction of the A-12 is close at hand. We are confident that the A-12 will remain on schedule and that we will be able to manage our A-6 inventory shortfalls in the interim.

Senator McCain. The recent "Naval Aviation Requirements Report" indicated no serious shortfall of F-14 aircraft over the next 10-15 years. What is your personal opinion on this shortfall problem?

Admiral Dunn. The Naval Aviation Requirements Report was published before the Amended Budget Submit; therefore, F-14 inventory figures in that report were based on the original proposal to manufacture 12 new F-14D aircraft per year through 1998.

Senator McCain. I have been advised that the N.A.T.F.—the replacement for the F-14—will not be operational until the year 2002 or later—so that we can fully expect to have at least some F-14's in the fleet until the year 2008 or later, before the fleet can be fully equipped and operational with an all N.A.T.F. complement. Can the current inventory of F-14's last that long without additional procurement of new aircraft?

Admiral Dunn. The present complement of F-14 airframes, less attrition, will still be operational in 2002. Many will still be operational in 2008 although airframe retirements will be heavy between those years. The production rate of the NATF will have to be scheduled and funded to offset the loss of F-14 airframes during that period.

2 SQUADRONS PER CARRIER

Senator McCain. You normally carry two squadrons of F-14's per carrier and had been assigning 12 aircraft per squadron, but a year ago, you reduced that number to 10 aircraft per squadron. Was this reduction at the request of the operational commander or would you still like to have 12 aircraft per squadron?

Admiral Dunn. The decision to reduce the number of F-14's in future carrier air wing (CVW) was the result of an overall CVW requirements study conducted in 1984 which received fleet CINC concurrence prior to finalization. In an effort to strengthen the carrier's striking power, the number of medium attack (A-6) aircraft was increased. F-14 numbers were reduced, partially because of deck space considerations, but largely in recognition of the inherent flexibility of the F/A-18 mission.

F-14

Senator McCain. Can the Navy afford to stop the F-14 production line before the N.A.T.F. is nearing completion of its development phase? What happens in case of a national emergency before the N.A.T.F. is fully operational? What happens if the N.A.T.F. is seriously delayed due to technical or cost or other problems?

Admiral Dunn. The decision to stop the F-14 production line in advance of more definitive data on the NATF was the outgrowth of an exhaustive examination of both the current F-14 inventory situation and the inherent risk attendant to such a decision. The F-14 inventory is adequate through the turn of the century and will remain equal to the threat by modernizing the existing F-14A's to F-14D's via a remanufacture program. We are satisfied with the NATF program development to date and are confident that NATF will be ready for fleet introduction in time to replace the F-14.

Senator McCain. What is the currently projected cost of the N.A.T.F. versus new F-14's in the year 2000 at equivalent production rates?

Admiral Dunn. Accurate cost data for the NATF have not yet been developed.

Senator McCain. The Navy has been planning to equip Reserve Squadrons with F-14's. Will that program continue or be canceled?

Admiral Dunn. Four Reserve Squadrons are presently equipped with the F-14A at 12 aircraft per squadron. At present, there are no plans to change that mix. However, the transition to 10-plane squadrons are presented in the Naval Aviation Requirements Report is currently under study.

COST OF F-14D

Senator McCain. I understand that the R&D costs of the F-14D were in excess of $1.1B. Why then are we not going to procure any of these new F-14D production aircraft?

Admiral Dunn. We have procured 19 F-14D aircraft from prior year budgets. The R&D costs for the F-14D are being applied to the remanufacture program, so the money expended to date is wisely utilized.

Senator McCain. I have been advised that both the outgoing and incoming Secretary of the Navy, supported by the C.N.O. made a strong case to O.S.D. in favor of continued production of the F-14D. Why then did it not receive favorable action by DOD?

Admiral Dunn. Cancellation of the F-14D new production was based on budget considerations after a complete review of its impact and associated risks. The Secretary of Defense determined the risks acceptable to achieve the required budget reductions.

Senator McCain. Admiral Dunleavy, you have been in the fleet in charge of all Naval Air Atlantic, for the past several years. Please tell us about the operational requirement for the F-14D and what in your professional opinion should be done re: the F-14D program?

Admiral Dunleavy. The F-14D, whether new or remanufactured, is vital to fleet air defense. The enhanced radar, engines, Electronic Counter Counter Measure (ECCM), Infra-Red Search and Track System (IRST), and other systems are necessary now to make up for compromises of the F-14A/AWG-9 Radar system and stay ahead of a rapidly developing and sophisticated threat. If fiscal realities dictate that new production be canceled, then a commitment to preserve the remanufacture program must be made and the continued development of the follow-on fighter should be a top priority.

[Whereupon, at 3:54 p.m., the subcommittee was adjourned.]

DEPARTMENT OF DEFENSE AUTHORIZATION FOR APPROPRIATIONS FOR FISCAL YEARS 1990 AND 1991

MONDAY, JUNE 5, 1989

U.S. SENATE,
SUBCOMMITTEE ON PROJECTION FORCES,
AND REGIONAL DEFENSE,
COMMITTEE ON ARMED SERVICES,
Washington, DC.

FAST SEALIFT REQUIREMENTS

The subcommittee met in open session at 2:05 p.m. in room SR-222, Russell Senate Office Building, Senator Edward Kennedy (chairman of the subcommittee) presiding.

Committee members present: Senators Kennedy, Cohen, Wilson, Gorton, and Lott.

Committee staff member present: Kathryn E. Bognovitz, special assistant.

Professional staff member present: Norman G. Mosher.

Minority staff member present: Mark B. Robinson, professional staff member.

Staff assistant present: Lori M. Jackson.

Committee members' assistants present: William J. Lynn, assistant to Senator Kennedy; Terrence M. Lynch, assistant to Senator Shelby; Dale F. Gerry, assistant to Senator Cohen; Dudley L. Carlson, assistant to Senator Wilson; Anthony H. Cordesman, assistant to Senator McCain; Robert M. Soofer, assistant to Senator Gorton; and Charles G. Pearcy, assistant to Senator Lott.

Senator KENNEDY. If it is agreeable to the other members of the committee, we will have Congressman Bennett give his testimony first, then defer to those members who have opening statements. I had an opportunity to review the legislation, and we welcome it very much. We will receive your testimony now and will move on to the other aspects of the hearing.

We welcome you over here and appreciate your taking the time to join with us. We know this has been an area of interest to you for a very considerable period of time; and we look forward to hearing from you.

STATEMENT OF HON. CHARLES E. BENNETT, A U.S. REPRESENTATIVE FROM THE STATE OF FLORIDA

Mr. BENNETT. One of the great pleasures of being in House-Senate conferences is to meet with you both, as a matter of fact. It is a real pleasure to work with you on maritime matters, and I appreciate your allowing me to come here.

We must move forward on the overall issue of maritime strength. Toward that end, the House Merchant Marine and Fisheries Committee, Chairman Jones, myself, and Mrs. Bentley, have introduced H.R. 2463, the Merchant Marine and Defense Act of 1989, which is based on the fourth report of the Commission on Merchant Marine and Defense, which you helped pass over here in the Senate. It has now made its fourth report.

In that fourth report it said that, and I am quoting now from Senator Denton, chairman of that committee, "clear and growing danger to the Nation's security in the deteriorating condition of American maritime industries." That is how he referred to it. He says, "Both our strategic sealift capability and the shipyard mobilization base today fall significantly short of the defense requirements, and we fear that without decisive action, the situation will substantially worsen by the year 2000."

I thank the Commission for its work. My goal, and that of the others, is to follow the Commission's intent, that we consider its recommendations as a package instead of piecemeal, as some have suggested we do. This package, the bill I have already referred to, everyone will not agree to all parts of it, but it is a compromise worked out among the various Commissioners after months of hearings and studies.

We all remember the Social Security program and how we called on our late, departed loved one, Senator Pepper, and how he brought things together. Some things in it were not perfect, we did not really like, but the overall package saved it, and it needs to be saved. The Commission has recommended things to save our Merchant Marine and to get a sealift that we can be proud of.

The Chairman of the Joint Chiefs of Staff, Admiral Crowe, recently told Congress that our most pressing problem now is the lack of adequate sealift capability. I heard him before our committee make this statement, and he did it spontaneously. He said the broader problem and also the capacity of our Merchant Marine is dismal; it is a disaster. The maritime industry in this country needs an infusion, it needs help, it needs resurrecting. That was the language of Admiral Crowe, and that was a spontaneous statement which he made, which is so true. The statistics are very sad, indeed, as to what our maritime situation has come to. We have come down from No. 1 to No. 15. The Soviet Union, on the other hand, has gone from No. 15 to No. 2. And we must solve this problem.

The purpose of my being here today is just to put a good word in for that. The bill that we have introduced I think will help us meet this, and I hope we can mesh it together. In other words, I hope that we can find either somebody to introduce it on this side, H.R. 2463, or that the provisions of your committee might address some of these things, because it represents years of work by Senator Denton's commission.

I came over here because I knew you were trying to solve this problem, and I think this does as good a job as any that I have seen. Mr. Jones, myself, and Mrs. Bentley have introduced it on the House side, and I am ready to answer any questions if you want me to, or if you want to go to another witness, that is okay. But I just wanted to say to you that I hope you will consider the provisions of this bill.

Senator **KENNEDY**. Thank you very much, Congressman.

I must say, in just a preliminary opportunity to review the legislation, one has to be enormously impressed at the time, attention and knowledge that you put into this piece of legislation.

I still can remember the words of my father, who was chairman of the Maritime Commission in the 1930s and was beginning at that time to see what was going to be the inevitable posture of the United States, and already trend lines were in place at that time.

We really have not come to grips with those trend lines, and we see ourselves now, as you pointed out very well, not only with regards to our ability to compete internationally, but also to provide the kind of fast sealift, which I think is, myself, a key missing link in the whole security posture of the country.

You have given this a lot of time and attention, as have the other members who are co-sponsoring that legislation with you. And all of us who are concerned about this know that we are fortunate to have both the attention and time that you have given to the issue, because it is of importance.

I think there is increasing recognition of this, as if we are able to see some kind of agreement as proposed by the President these past days in Europe. The idea of prepositioned equipment is not going to be as available. We are going to be more and more dependent upon how we are going to move across the sea if we are going to pursue our vital interests.

So, I think your leadership in this is again a very timely one, and I want to thank you very much for coming over and joining us.

Mr. **BENNETT**. Thank you, sir.

Senator **KENNEDY**. Senator Cohen.

Senator **COHEN**. I would add my own words of commendation to Chairman Bennett. I worked with him for a long time when I was in the House, and since I have come to the Senate.

Mr. **BENNETT**. We miss you, and Mr. Lott as well.

Senator **COHEN**. Sealift is much like the weather, what has been said about the weather. Everybody complains about it, but no one is willing to change it. I mean, we have been talking about sealift since I have been on this committee, what desperate shape it is in, how our shipyards are now closing down, how we are totally dependent upon the Navy for construction of ships. We have no civilian ship construction to speak of.

And it kind of gets bounced back and forth between who is going to have jurisdiction. Should it come under the Defense Department? The Defense Department says I do not want the ball. We cannot afford it; we are looking at declining budgets. Transportation is not going to do anything about it.

So we keep talking around and around, and nothing ever gets done.

So I think that your proposal, whether it emerges finally in that form or not, is a good first beginning, Mr. Chairman. I look forward to working with you on it.

A couple of other thoughts that occurred to me that Senator Kennedy mentioned, the NATO proposals and the reduction in forces, what is that going to do as far as prepositioning. I also think that we are perhaps going to run into a problem we have not anticipated before, and that is in terms of sealift, just by building more ships, it is not going to solve the problem either, unless we take into account what the Soviet Union is doing in terms of their submarine construction.

The rates of their submarine construction are really enormous compared to what we are doing in this country. And we can put more and more U.S.-controlled ships, container ships and others, into the fleet, but if we do not take into account the type of attack submarines that are being deployed by the Soviets in ever-increasing numbers, it really will not make much difference. We will not have the ships survive that will be going over to reinforce NATO or our other allies. So, I think we have got to focus also on what is going on with submarine construction and deployment in the coming decades.

I thank you, Mr. Chairman.

Senator **Kennedy**. Senator Lott.

Senator **Lott**. Thank you, Mr. Chairman. I will be very brief.

Just to say welcome to my friend and colleague from the House. It is a pleasure to see you again, Mr. Chairman. You have always done a great job in the area of shipbuilding. I have enjoyed working with you.

I have not had a chance to look at your bill, H.R. 2463, but I certainly am going to get a copy of it and start studying it. I am looking forward to working with you as a new member of this subcommittee.

Thank you very much.

Senator **Kennedy**. Senator Gorton.

Senator **Gorton**. Thank you, Mr. Chairman.

I look forward to hearing what the Congressman will say to us, as well as the rest of the panels.

Mr. **Bennett**. Well, I can make a brief resume for you as I close out on this matter, because I know that you all are very busy.

This bill will cost money. It costs about $13 billion. But it gets back directly into the Treasury over $10 billion; $10 billion comes back while $13 billion is being spent. And the gross national product will increase by $43 billion, so there are ways of tapping additional funds and making it come out even.

A problem that you have to think about is that we cannot expect to build all the ships to carry all the material. We can't have ships laying by to do that. But if you relied upon that entirely, you have totally overlooked the fact that there would have to be personnel that runs them, and the only way you are going to get personnel to run them is to have an active Merchant Marine.

That is what Admiral Crowe was addressing. He was not addressing the fast sealift. He was addressing the problem of having enough ships to take the material over in time of a war.

You referred, Senator, to the change of complexion of what is happening in Europe today. Of course, that makes it all the more necessitous that we do something about it, because if you bring down the military strength on each side, which I think we should do and have to do really, then you are going to be confronted with the necessity of moving things over there if there was an actual war that occurred. So that it probably does not get less with the reduction of the strife over there; it actually gets a little more, because you have to be able to move the things because they are not going to be there in place.

Thank you very much.

Senator KENNEDY. You have certainly put your finger on one of the very, very important and significant additional challenges that we have got to face further down the road. We welcome your willingness to come over here.

Mr. BENNETT. Thank you for your wonderful contribution to the defense of our country.

Senator KENNEDY. Thank you very much.

We will proceed now with the opening statements.

OPENING STATEMENT OF SENATOR EDWARD M. KENNEDY, CHAIRMAN

Senator KENNEDY. In the period of declining defense budgets, the Projection Forces Subcommittee has focused its attention on developing bridging strategies to preserve or enhance the deterrent value of our military forces. It is widely agreed that the quality of our people and the superiority of our technology are the essential characteristics of deterrence.

As budgets decline, we must seek to protect these crucial elements in our military forces. Any major military effort in which we participate overseas is absolutely dependent on an uninterrupted buildup of combat forces and logistics from the sea.

The airlift is important. It may be, as some say, the quality portion of the strategic lift. But airlift can only ensure that you do not lose early. To win you must have sealift. For example, in the European conflict, 95 percent of our equipment and logistics would have to arrive by sea.

Two kinds of sealift are required. The largest requirement is for the combat sustainment, the resupply effort. Large commercial container ships dependent on developed port facilities are suitable for this task. They do not have to be fast. Once a great sea bridge of these ships is established, resupply should be continuous.

Of greater concern is the portion of sealift characterized as the surge requirement. These ships must carry unit equipment to fill our units airlifted to the combat zone. Cargoes will be typically high volume and low density—airplanes, helicopters, trucks, tanks, jeeps, armored personnel carriers, and artillery. These cargoes may have to be delivered where developed port facilities do not exist. Ships suitable for surge capability should be able to offload at undeveloped ports and over the beach in order to be as close to the receiving troops as possible.

Obviously, these cargoes must arrive quickly. This could be done in several ways. One is to load the ships and keep them near the point at which the cargoes will be required. We have ships loaded and prepositioned today for several contingencies.

Another approach is to preposition equipment on the ground to meet the arriving troops. We have prepositioned equipment for several divisions at POMCUS sites in Europe.

The most flexible approach to the requirement for surge forces to Europe and elsewhere is to build fast ships, ships that can cross the Atlantic in a few days in response to a crisis. We have eight ships in the category. No one pretends this is an adequate number.

Over the past 2 years, this committee has received repeated testimony from our commanders in the field that the biggest gap in our ability to reinforce NATO Europe results from the absence of sufficient fast sealift. This fast sealift requirement could become even more pressing as a result of conventional arms reduction in Europe. If mutual reductions take place in Europe, American forces will be withdrawn across the Atlantic, while Soviet forces will remain at the other end of the European rail network.

In such an environment, a robust fast sealift program would be a crucial element of continued conventional deterrence in Europe. The subject of this hearing is how to address this fast sealift gap, but there is a broader problem.

Over the past year, there have been several studies describing the worsening problems of the American Merchant Marine; specifically, our shipyard industrial base is declining, and our Merchant Marine fleet is shrinking at a precipitous pace. But I think it is important for this committee not to be drawn off at this time to those questions. Our focus today should be the development of fast sealift capabilities to satisfy important military requirements to surge forces to regions where they are needed.

Ships satisfactory for this surge requirement are often uneconomical for commercial purposes. They are designed and built optimally to fill military requirements. But the advanced technologies developed for fast sealift ships may have important second-order effects that assist the Nation's shipbuilders.

As the only customer of the Nation's shipyard, the Navy has a special and delicate and difficult responsibility for this portion of our industrial base. Our witnesses this afternoon are the former Under Secretary of Defense for Acquisition, Dr. Robert Costello; former Assistant Secretary of Defense for Installation and Logistics, Dr. Larry Korb.

Dr. Costello and Dr. Korb will form our first panel, and we are very glad to welcome them. But before we hear from them, I will ask the other members of our committee if they want to say a word.

[No response.]

Would you be good enough to proceed, Dr. Costello?

STATEMENT OF ROBERT B. COSTELLO, FORMER UNDER SECRETARY OF DEFENSE, ACQUISITION

Dr. **Costello**. I apologize for not having a prepared testimony, but I am prepared to testify, so I will start off.

Senator **Kennedy**. I think it is fair enough to say that you have been good enough to adjust and change your plans to be with us. As I understand, you have an enormously important meeting, the movers are descending on your house.

Dr. **Costello**. They are.

Senator KENNEDY. So we appreciate very much your willingness to adjust your schedule to be with us, and we will not detain you long.

Dr. COSTELLO. Well, it is an extremely important issue that we are looking at today. I do not know how we can separate sealift from maritime strategy from the competitiveness for the United States. So if you will allow me a couple of minutes to lay out some of the basic groundwork.

When I joined the Hudson Institute, we decided we would put together an agenda for technical and manufacturing leadership in the United States, and if you wanted a good example of where we have not done a good job, certainly our maritime strategy is one of the better ones.

So it is not a simple issue. They are interrelated issues. We have five major efforts that we have to take a look at that cannot be really separated. One deals with technology: how do we keep up, how do we regain what we have lost, and how do we establish that ongoing leadership and technology that we need. And I will come back to that as we talk about sealift, fast sealift and maritime strategy.

You have to look at manufacturing. It is my contention that you cannot maintain your leadership in technology unless you have a manufacturing base that is directly and concurrently involved with design and manufacture. When we have looked at the semiconductor industry, we have said that we have to have manufacturing in the United States. I think it is true of every part of the industry, that technological leadership goes hand in glove with manufacturing capability.

Economics is key. You have indicated, and Congressman Bennett has also indicated, the situation that we find ourselves is one in which we have lost significant leadership in maritime transport. But I think it is also interesting to reflect and say in 1978 seven out of the top 25 banks in the world were United States banks. In 1988 only one of the top 25 banks was a United States bank.

They control where people put their money. They control the investment for leadership, and for manufacturing, and the associated technological edge that we are looking for.

I classify a whole broad spectrum of things under social issues. This deals with education, management styles, the approach that we are taking toward—most of the people will smile, especially those in the Navy—to the concept of total quality management, which says improving everything we are doing so that we can be worldwide competitive.

And there are obviously in the issue, and that is why we are here today, significant political factors—State, local, Federal, and certainly international political pressures being applied, including significant lobbying by foreign interests to dissuade us from what might be a comprehensive and aggressive program for the United States.

But let us get back to sealift and maritime policy. I want to carefully and ambitiously challenge everybody in the room. How can we, specifically the Navy, maintain the outstanding leadership we have enjoyed in building combatants if we do not have a robust, competitive Merchant Marine base—that includes a maritime base, building, designing, running ships—on which to build? Where will the naval architects, and engineers, and operators come from to provide that continuity of leadership that we have enjoyed over the past 40 years, if we are limited to building 20 ships a year? And that is a level which some people feel we may not even be able to attain.

It is not a separate industry. It is a segment of the broad maritime industry that we are concerned about. The appropriate action, and we had worked with Senator Denton, with the Maritime and Sea Power Commission that he headed to start with a clean sheet of paper, and we need to establish some real guidelines for our maritime policy, specifically looking at the fast sealift issue.

We have to study where is the rest of the world with advanced naval architecture concepts? Where are they with naval engineering? The Navy has indicated that they are going to demand or dictate that there will be electric propulsion systems on combatants after—I think it is 1992. How about if we do the same for our sealift, only take another step and use superconductive electric propulsion systems, even cryogenic ones, because that would put us in a leadership role immediately in that area.

And I think if we are going to look at the fast sealift, we have to take a dramatic step forward to look at novel and unusual approaches. We have to look at shipbuilding and the constraints that we put on shipbuilding because of our standards and specifications that may limit the application of newer technology. It is my understanding that in some of our activities we limit subelements, subsections of the ships to 50 tons so that all the yards can bid, whereas some of our competitors elsewhere in the world are at 200 plus tons in subelement construction.

We need to look at ship operations, because we can build ships, but we have to have the crews trained to operate them. We need the officers available to operate them.

We certainly have to look at standards and specs and simplifying both to reduce the burden on the shipbuilding and the ship operations that we have found ourselves strapped with over the last 20 years. And then we have to get the users involved. We really need to take the users off to the side and say what else can you do with containerization? What else can you do with that high cube cargo that is difficult to handle expeditiously with today's approaches?

What we are talking about is fast sealift. It has been well documented that we have a critical shortage in the area. We have to look at that as part of the overall maritime strategy, because I think to separate the two will not do justice to either.

And it is a perfect example today, as we look at the industry, of what happens when we do not have a coordinated, consensus approach with which to work in the United States.

Thank you sir.

Senator **Kennedy**. Dr. Korb.

STATEMENT OF LAWRENCE J. KORB, SENIOR FELLOW, FOREIGN POLICY STUDIES PROGRAM, THE BROOKINGS INSTITUTION

Dr. **Korb**. Thank you very much, Senator. It is a pleasure to be here.

Like Dr. Costello, I do not have a prepared statement. I was on my way to Japan last week, when I was asked to come here, and I just returned.

I would like to make a couple of comments to expand on some of the things you and some of your colleagues have said. In talking about this subject one must take a look at both the fiscal and the international environment, as well as the state of lift right now.

In terms of the fiscal environment for the Department of Defense, it is important to note that between fiscal years 1986 to 1990, the Department received about $600 billion less than it had projected, and in the 1990 to 1994 period, I would argue that the Department will receive about $200 billion less than the budget that was bequeathed to it by the outgoing Reagan administration.

In regard to the international environment, many things have changed. Since the Congress mandated their mobility study a decade ago, particularly in the area of the world that that prompted the study. The Iran-Iraq war has ended, and the Soviets have withdrawn from Afghanistan. President Bush has, as well as President Gorbachev, put forward plans not only for reduction of forces in Europe but repositioning of those forces.

As regards Europe, we are well on our way to the de-nuclearization of that continent. Once President Reagan signed the INF Treaty, it was clear that the Germans could not agree to modernize the short-range nuclear forces. The consequences of this on future wars are profound.

If the forces are reduced and repositioned, you should have more mobilization time, but since you do not have nuclear weapons to rely upon, the conventional war will be of longer duration.

In terms of the improvements in airlift since 1980, we have bought over 100 new military and civilian airlift aircraft, if you count the 23 planes that are being reconfigured for CRAF.

We have also, as you mentioned, prepositioned an awful lot of material, both on land in Europe and in other parts of the world aboard ships. We have made some improvements in sealift. DOD has reconfigured the eight fast sealift ships. We have expanded the RRF from 24 to 91, and we have put the sea sheds and flat racks on some 25 container ships. But as Secretary Carlucci said in his last statement to the Congress, all of the gains in sealift have been offset by a decline in the size of the United States flag fleet.

Where does that leave us? I think it means we must look for a solution that is both cost effective and provides us the flexibility we need to deal with the rapidly changing international environment. And in my view, sealift is an area whose time had come a decade ago, and is even more critical now.

Sealift is cost effective. For 5 percent of the cost of buying a C-17, you can move in 2 weeks the same amount of tonnage to Europe. We do know that we do not have anything like the fast sealift available. I think it is important to remember we bought those sealand vessels, the fast sealift ship in the first year in the Reagan administration—primarily because they were available and they were uneconomical for the commercial people to operate, so we were able to procure and modify them.

There does not seem to be anything like that available now, so it behooves us to begin a research program now that will help us develop that capability, as well as dealing with the problems that you and Dr. Costello have mentioned about our shipbuilding base.

A decade ago we had 25 yards building ships. The number is now 16, and it will probably be down to 10 or 11 at the current rate that we are building Navy ships.

A good analogy for helping the commercial yards might be what we are doing in other areas. For example, the Congress has in the last year decided that the Department of Defense will help commercial industries in areas like high-definition television, as well as semitech.

It seems to me that this is an appropriate model to look at the area of sealift, because it becomes a win-win situation. If we have a R&D program for sealift that is financed by the Government, the department wins and the industry wins, if it can become competitive again. According to my projections, it may be able to get 2 or 3 percent of the increasing world commercial shipbuilding in the next decade, if it becomes viable.

However, if we move in this area of depending more on sealift, as Senator Cohen has mentioned, then there is the threat from the submarines to be considered. Therefore, I think, you must also go about providing the Navy with at least 90 helicopter-equipped escort vessels. And make this a very important part of a real maritime strategy, which in my view, over the past years, has emphasized power projection at the expense of sealift.

Finally, to the extent that the Congress sees problems in the area of lift, I think that you have to do here what you did in the area of Special Operations Forces. I think that just as you have mandated that you have a separate budget for Special Operations Forces, I think that you ought to have one for the Transportation Command so you can make the tradeoffs among these various areas.

Thank you very much.

Senator KENNDY. Well, for two witnesses that did not have prepared testimony, you have given us a lot to think about.

I will recognize Senator Cohen, who has a schedule conflict.

REDUCING BURDENS ON SHIPBUILDERS

Senator COHEN. A couple quick questions. Dr. Costello, you have talked about, we have to reduce the burdens on our shipbuilders and on operations. Are you talking about either construction subsidies or operational subsidies?

Dr. COSTELLO. First of all, I think we have to look at rules and regulations standards and specs that may no longer be applicable. We have to make it easier for them to do their job.

Then, second, I think you have to look and say, how much does it cost me to have the Reserve Fleet there. Would it not be better if I used that money to subsidize or underwrite some portion of the useful operation of those vessels, because we are not getting the appropriate level of commitment on training of the crews, et cetera, the way it is today.

I think we have to look at an active Merchant Marine, and decide how much it is going to cost us.

Senator **Cohen**. And not get hung up as to what we call an operational subsidy or a construction subsidy?

Dr. **Costello**. I am not—I am not saying, I do not see that many other options.

I think that we have to—if we can be competitive in the manhours of operation, or the manhours of building, and we have structured carefully and know what that competitive number is, then we have to look at the competitors in that area and say what is their rate of exchange, because that is a political margin of maneuvering.

And perhaps we need to help compensate our people for the benefits that are legislated, whereas those other countries may not have the same level of benefits, or standards, or specs, or whatever it is.

If we hold our standards this high, then we should be able to somehow compensate the operation, the user, and the builder to meet those same standards.

LOBBYING BY FOREIGN INTERESTS

Senator **Cohen**. You also referred to lobbying by foreign interests to our detriment. What did you mean by that?

Dr. **Costello**. I think that we often find that when we want to make some changes, there are strong lobbying efforts by the special interest groups of the, some of the other countries that are quite active here in Washington.

Senator **Cohen**. You mean accusing us of being protectionists?

Dr. **Costello**. Protectionists. Doing, making other changes that would be, perhaps, advantageous to one segment of the U.S. infrastructure, the industrial base that we have. They will play one side of the industrial base against the other. They will play the importer against the manufacturer. And they are divisive in those ways. And they play us very effectively.

Senator **Cohen**. I think many of us have seen this in the field of textiles, by the way, and how manufacturers and importers getting played off against one another.

MAINTAINING FLEXIBILITY

Dr. Korb, you indicated that now that the world situation is changing, the Iran-Iraq war has ended; Afghanistan, the Soviets have moved out, witnessing the denuclearization of Europe, should we try to structure our forces based upon this kind of rapid change, or should there be some—are you suggesting that sealift, no matter what the changes are, are going to remain steady, the need for sealift no matter what changes take place will always be constant?

Dr. **Korb**. I think so. My argument would be, that what you need to do right now is maintain your flexibility, because the environment is changing so rapidly with the resources we have in defense that we need to have a flexible force within whatever amount of money is available.

And regardless of the changes, I would argue that the need for sealift is becoming even more pressing, given the changes in the environment.

C–17

Senator **Cohen**. Now, is it fair to say that you and Dr. Costello had never been big fans of the C–17?

Dr. **Korb**. I think it is fair to say that.

Senator **Cohen**. Doctor, I notice you have not been terribly sympathetic toward the Aegis destroyers or the big carriers.

Now, you mentioned that there has been too much of an emphasis on power projection to the detriment of sealift. Now, what, in your judgment, is the proper balance?

Dr. **Korb**. Well, I think my feeling has been that in any time that you are building military forces, regardless of the budget level, you must do it in a balanced way.

And so, therefore, I think when one takes a look, for example, at the area of naval forces, one must be as concerned about sea control as you are with power projection.

And I think if you look at where the amount of resources went in the beginning part of this decade, you will find that the Navy put an awful lot of emphasis on power projection by building a lot of very expensive ships that were useful primarily for power projection. Because of that, you now have a situation in which you are going to have some difficulty dealing with the Soviet submarine threat, if, in fact, you wanted to reenforce Europe by sea.

Similarly in the area of transportation, I think we do need more lift of all kinds. But, in fact, if you take a look at where the money went that was put into lift in this decade, you will find that sealift has not received, in my view, its share.

And if money were no problem, I think the C–17 certainly would help us. But if you ask me right now, with my marginal defense dollar, whether I wanted to put it into sealift, or go ahead with the C–17, I would continue buying C–5s, and buy sealift.

Senator **Cohen**. I think that is all I have. Thank you.

Senator **Kennedy**. Dr. Costello, as has been mentioned earlier today in the course of the hearing, the development of what we have in terms of sealift has been primarily, not exclusively, in the purchase of ships from different commercial groups and owners in previous years.

If we were to decide to reverse the direction taken in the past, develop the technology, as well as to optimize the military sealift, with an eye to the possible application, in the commercial sector, where do you expect to find the expertise to be able to do that?

Dr. **Costello**. That is one of the issues we brought up with Senator Denton. In fact, we felt so strongly about it while I was still in the Defense Department, we sent over to the National Security Council a recommendation on sealift, which stated that there should be a National Security Council intensive study on sealift, interagency study, so we can get some consensus.

Because if you ask five agencies, you are going to get 10 different answers. And I don't think it is important that we finally, jointly understand the nature of sealift.

We are an island country without a maritime strategy, and it has been used against us. Bits and pieces have been used against us.

I think that we still have significant technology available to us in the country. I am concerned that with only 20 ships being built a year, those are combatants, that we will fast lose the broader base that we have had that has brought us to where we are today.

I think it is an issue that we have to undertake very rapidly before we have further atrophied through the educational process and the application and use of the vessels at sea.

Senator KENNEDY. In that evaluation of industrial base, did you get into looking at competition and whether competition in the traditional way perhaps offers a potential for further disadvantaging the American shipbuilding capability?

Dr. COSTELLO. I have my own harder role for competition. Often we use competition in the more traditional sense. I send out five bids, I get back five bids, I have closed envelopes, and I look at them and I get the lowest price. That may not be the lowest cost by far.

I think it is very important that the user in this case is going to be well represented by General Cassidy. I think that the user has to be involved in carefully restructuring his demands.

I think they have to work closely with some of the most knowledgeable people in the shipbuilding industry, as well as the naval architects, the naval engineers, to make sure we have the right kind of command control structure on ships to fully exploit the technologies that are available to us today.

Carefully study what the rest of the world is doing. I did this some years ago in the steel industry and I have been complimented since that we put the steel industry back, at least on a role to be competitive in the United States on fundamental costs of steel.

I think we have to do the same kind of program. Carefully study what the rest of the world is doing.

I was almost—I was appalled. I was leaving to go to the Far East and I was mulling over the issues of the sealift strategy that we had, and the Japanese announced that they were going to come up with a 60-knot cargo ship. We do not have anything like that on our agenda. I think it is time that we did.

I think it is time that a maritime nation looked at the requirements and got with it.

DIFFERENT TECHNOLOGIES

Senator KENNEDY. You mentioned just some of the technologies earlier in your testimony. Were those examples of different technologies and are there others as well?

Dr. COSTELLO. I think there are others. I think that ship construction, if you go to our yards it is still very labor intensive.

There are a lot of advances in manufacturing that have not been applied to the shipbuilding area. Primarily, for one reason, in many cases, because our standards and specs say we cannot use modern technology.

So that is why I say that as we started in the Defense Department to scrub through the rules, regulations, standards and specs, we put out a book in the first part of this year, streamlining defense standards and specs that has had a major impact on our ability to use conventional commercial parts.

We have got to do the same thing when we start looking at shipbuilding as well.

DEFENSE BUDGET

Senator KENNEDY. Dr. Korb, you have been recently working with Dr. Kauffman in analyzing the defense budget and in reviewing it, I see that you recommend and your plan calls for 20 ships of the rapid sealift type.

I would be interested in the reasons for arriving at that. Perhaps you would tell us a little bit about the types of technology that you think is required for the sealift and whether, finally, just whether it has a commercial application?

Dr. KORB. Well, I do not think that the technology is there right now. As I said, we were very lucky in the early part of the 1980's, when sealand could not afford to maintain the SL-7's, because they built them before the cost of energy went up. So we were able to purchase them and to modify them.

But that is what we need to do, in my view, is to begin an R&D program now that will do something like Dr. Costello mentioned.

I mean, if the Japanese can develop a ship that can go 60 knots, there is no reason why this Nation cannot do so.

And I think that the R&D that is done in that area will help the maritime industry to amortize some of the investment they need to make to begin to develop the technologies and the work force to be able to compete as the demand for commercial ships grows around the world.

And as I noted before, this approach is very similar to the one we are taking in areas like HDTV, where the Department of Defense needs it, but with the money from the Department of Defense, companies then can also become competitive in the commercial market.

Dr. COSTELLO. I think it is, going on, adding to what Dr. Korb has said. The Department of Defense may be able to be a critical market, the critical size of market directly available to us to put the American industry in that segment in a leadership role, right from the start, that no other country would enjoy.

Senator KENNEDY. Senator Lott.

Senator LOTT. Thank you, Mr. Chairman. Just a couple of questions.

NEED TO IMPROVE U.S. SEALIFT CAPABILITY

Dr. Costello, over the years that I was in the House, where there has always been a lot of discussion about the need to improve our U.S. sealift capability, the trend lines have been, you know, very clear. They have been headed down over all these years that I have been in the Congress and maybe we have reached bottom, more or less. And that accounts for why there seems to be renewed interest and concern in it.

I just wonder, though, if the requirement is so great, why has OSD not done more? Why haven't they added more to their budget? Why now? Why have we let this thing get into such a deteriorated condition?

Dr. COSTELLO. I think I will characterize that they are fighters, and supply guys usually come up second best. And that has been true of the past 10 years, for sure. Larry, you would agree?

Dr. KORB. Let me make a comment on that, because I think it is very important——

Senator LOTT. And both of you had been over at OSD. You know, I am asking you why have you not done something about it?

Dr. KORB. Well, some of us tried. But let me make a point here, a very critical one. The problem of not giving the proper emphasis to transportation has been recognized as early as in the late 1960s and early 1970s.

When David Packard was Deputy Secretary of Defense, he tried to set up a transportation command. He was frustrated by the Navy.

When I came into office 10 years later, we went through the same exercise. This time we got it through the Joint Chiefs of Staff, and again we were frustrated by the Navy.

To his credit, Dave Packard, when he came back in to chair the Packard Commission, worked with the Congress, and as part of the reorganization acts that have been passed in the last couple of years, you have finally set up a separate Transportation Command.

Like the area of Special Operations Forces, because transportation is out of the traditional ethic or concerns of the military services, Congress must ensure that transportation has that spotlight in the budget.

And that is why I urge, just as the Congress did with Special Operations Forces, that you do it with transportation, because you will not approve sufficient funds for lift, particularly sealift, unless you have a separate budget.

I believe that setting up the Transportation Command has been one of the most significant pieces of legislation passed in a long time. I would urge you to go one step further and give them their own budget, so that, working with General Cassidy, you can help in assessing those tradeoffs and to make sure it gets its fair share.

Dr. COSTELLO. Senator, I might also add, with the cooperation of the Navy, and working directly with General Cassidy, we were able to put together a very strong recommendation for a sealift, or maritime strategy out of the Department of Defense earlier this year.

Senator LOTT. Then you have no doubt in your mind that this is a critical area for our future security?

Dr. COSTELLO. Absolutely.

JAPANESE VESSELS

Senator LOTT. One other question. You mentioned, both of you mentioned this Japanese capability for vessels, cargo vessels that go 60 knots. Is it really essential that we have the fast sealift, rather than just merely the normal slower sealift?

I mean, if you go to sealift, obviously, you do not expect it to make the time you expect in transport. How essential is the fast sealift capability?

Dr. KORB. Well, I would argue that right now you need more of it than you do of other airlift. Fast sealift is your most critical area.

But you do need all kinds of lift. But, certainly, right now since you only have the eight SL-7s, I would say that you need to put priority there.

Senator LOTT. Thank you, Mr. Chairman.

Senator KENNEDY. Senator Gorton.

SHIPS MEETING SPECIFICATIONS

Senator GORTON. How many ships, or pieces of equipment exist now that meet your specifications anywhere in the world?

Dr. COSTELLO. If you are looking at me, probably none, because I am a challenger. I think we can all do better. I think we have to take a look at where we are today.

There are some exciting things that have been done in Europe on commercial ship construction and operation. But I think that the traditional approach to maritime naval architecture, naval engineering, does not really promote radical changes.

So when the chief of naval operations dictated that all Navy ships would be propelled with electric propulsion, after a certain date, that was a very radical change.

I am suggesting we make, we compound that radical change and say, let us use cryogenic superconductors as part of that electric propulsion so we become the leaders in one area. And then we can take that one area and grow broader leadership, perhaps, in the whole area of maritime strategy, maritime capability.

Senator GORTON. You are going to get all that for $13 billion?

Dr. COSTELLO. I have not put a price tag on mine. That was Congressman Bennett's statement. It may not cost you an awful lot, because there may be some tradeoffs. It depends on who you want to talk to.

The electric propulsion is almost a tossup on the combat ships, combatants. Gee, if it is a tossup, why do we not use it? Well, the tradition says that we do not have to. That it is cheaper, perhaps, to continue to use what we have with less risk.

I am saying it is time we took some risk in these areas.

Senator GORTON. To the extent that we are dealing with a more traditional technology, assuming the kind of emergency which would require this kind of sealift, is it not going to be either available from our allies, or would we not just simply pick up any ship we want that is anyplace on the seas with the kind of Navy we have?

Dr. COSTELLO. We fought the War of 1812 against the Barbary pirates, when they picked up some of our ships. We may not be able to do that too well. I think that——

Senator GORTON. Would we get into a war with Panama, if we seized Panama——

Dr. COSTELLO. I think the Navy has some data later on to show you about what is happening to the total available sealift capacity, and it is a downward trend.

Senator GORTON. Thank you, Mr. Chairman.

Senator KENNEDY. I want to thank you for very provocative, interesting testimony, and I find it very, very challenging for us, as well. It has been enormously interesting and helpful.

I know both of you inconvenienced yourself to come here, but you have obviously given this a good deal of thought and had a good deal of experience, so we are very appreciative.

Dr. Korb, we thank you.

Dr. **Korb**. Thank you.

Senator **Kennedy**. And Dr. Costello, I am not sure you would want to get back and start moving those boxes around, do you? I thought you might want to stay for the rest of the afternoon.

Dr. **Costello**. I am going to stay for the afternoon. This is too important. [Laughter.]

Dr. **Korb**. Senator, since you mentioned our study, I would like to have this entered in the record, if I may?

Senator **Kennedy**. Yes. Thank you. Sure, it will be included as part of the record. Thank you very, very much.

[The information referred to will be retained in committee files.]

Senator **Kennedy**. Our second panel consists of the Commander of the U.S. Transportation Command, Gen. Duane Cassidy, the Deputy Chief of Naval Operations, Vice Adm. Stanley Arthur, and the Acting Under Secretary of the Navy, Assistant Secretary (Shipbuilding and Logistics), Everett Pyatt.

I want to extend a warm welcome to all of you and express my appreciation to all the members of the committee for taking the time to attend this hearing. We appreciate it.

I want to just indicate that General Cassidy has always been very willing to be available to all of us who are interested in this subject matter, and it takes a good deal of time in keeping us all abreast of this whole issue; we are very glad.

Admiral Arthur, we appreciate your presence here.

And Mr. Pyatt, we appreciate having you back for our committee, and for your very helpful testimony the last time this committee met.

Mr. **Pyatt**. Thank you, sir. I was sorry for the confusion there, but I thought I was going separately.

Senator **Kennedy**. I am sorry.

General Cassidy, do you want to start? Whatever way you or Admiral Arthur would want to proceed.

After those two have given their testimony, we can hear from Mr. Pyatt; I think that would be the best way for us to deal with the issue most effectively.

Around here we proceed by years of service. I am always reminded of when I first ran for the Senate I always said it is a time for young men with new ideas. And now I have been around 27 years, I say there is no excuse for experience.

STATEMENT OF GEN. DUANE H. CASSIDY, COMMANDER IN CHIEF, U.S. TRANSPORTATION COMMAND

General **Cassidy**. Fine. I think I have Admiral Arthur on both date of rank and age, so I will go ahead first. [Laughter.]

I appreciate sincerely being asked to appear again before you and your entire subcommittee, Senator Kennedy. It is good to be with all of you and I appreciate your support for the U.S. Transportation Command. It has been a very exciting experience for me, and I find myself in strange company. As you notice, here I am talking sealift issues with Admiral Arthur, who certainly knows more about salt water than I do.

Nonetheless, I have been given, I think a formidable job, a formidable task to take on; and it is an exciting time to be doing it as you can tell by the questioning of the previous two witnesses. Indeed, there is a head of steam up for what I believe is a national emergency, and that is the maritime business of our country.

I think things are different now than they have ever been before. And I think this is one moment in time that if we will put a coalition together and act, we can get something done. I am very, very willing to do whatever I can to take part in that.

For the first time, I think, our country is viewing transportation as a total system. And I think it must be done that way because times have changed.

The buzz words today for transportation as a total system are "origin-to-destination" transportation and "just on-time delivery." Those sorts of things are making money in the commercial world today.

It is one system, serving the needs of the Nation in peacetime to our economic advantage, and that very same system is applicable in times of crisis, whether full mobilization, which we tend to focus too much attention on, frankly, or non-mobilized contingencies, like the ones we have been through in the past several months with the Iran-Iraq war and the Persian Gulf situation, and even just recently the movement of troops and equipment to Panama.

But, nonetheless, the same system that in peacetime responds to our economic advantage, in wartime responds to our security advantage.

Transportation becomes the key to our ability to influence, to compete or to actually survive.

So I think the focus that you have brought upon all of transportation now is very timely.

To focus on any one element of the transportation system to the detriment of the others, I think, is wrong. Nonetheless, I appreciate the opportunity today to focus on fast sealift, and that is really why we were called here.

Fast sealift is one aspect, then, of strategic sealift, and in turn, strategic sealift is an element of the balanced mobility equation which I have to deal with all the time.

Sealift must be considered along with those other key elements, which are airlift, prepositioned equipment, and maybe the most important one at times; command and control.

I will not talk today about all the other elements. Airlift is on track. The C–17 is under production. You have given me full support on that program and I appreciate that.

We have looked at prepositioned equipment very carefully. Since the U.S. Transportation Command was established, we have made many adjustments. We do know exactly what we have, although we do not have enough. We do not necessarily have it in the right place, because we do not always know what the right place is. We, indeed, have made some strides in that area.

Each mobility element has unique features. All are needed at adequate levels to provide essential mobility support in this very unusual time we are coming into.

I believe we are in a time of more unknowns than we have seen before. But I think, like both Dr. Costello and Dr. Korb who appeared just before us without question we will need more flexibility in the future than we have ever needed in the past.

Therefore, Mr. Chairman, I would like to bring up two very good questions you asked me in the hearing on April 18th, which I have dwelled on since then with my staff.

That is, what should we be doing to develop additional fast sealift capability, and to increase this Nation's strategic sealift capability? Those are two very distinct and separate questions.

I believe, unlike airlift, sealift is rightfully and maybe almost totally, a non-military force. Historically, we have relied on the civilian merchant marine to be our fourth arm of defense and provide our wartime sealift capability.

Our Merchant Marine has a long, proud tradition of wartime service to this Nation. And the Merchant Marine Acts of 1904 and 1936 codified the need to preserve a robust Merchant Marine.

Their words were very, very specific. As a matter of fact, the law of 1936 was so specific that I find, theoretically, because we are not following that law today, we have let the Merchant Marine slip to its current state.

So we need to chastise ourselves, look at that law that is on the dockets, read it, and reinforce our commitment to that statute.

The Merchant Marine has served us well through two World Wars, Korea, and Vietnam, and I am convinced we should give this proud force every possible chance to meet our future needs as well. Not because of tradition, but primarily because it makes good sense, and frankly, it is the only solution our country can afford.

If we had all the money in the world in the Department of Defense, spending one dime of it on sealift when the Merchant Marine could be built up to do it instead would be wrong.

As I mentioned to you on April 18th, they are really two separate issues. First, there is an immediate need to continue research and development of fast sealift technology and sealift technology in general.

Second, we must set about a strong and steady effort to increase this Nation's total strategic sealift capability.

First to fast sealift. Admiral Arthur and I had a great opportunity just recently within the last 3 weeks to be aboard a high-speed surface effect ship at the Naval Air Station in Patuxent River, Maryland.

The experience was unique. It demonstrated that the concept of fast sealift is doable. It was a pretty good, size ship, a dual-hulled ship with lift devices and skirts fore and aft. We clipped along at a pretty good speed and it was very comfortable.

However, the concept of truly fast sealift is 50 to 60 to 80 knots, but the definition of truly fast depends a lot upon the user. And, quite frankly, 60 to 80 knots in my upbringing is not terribly fast. [Laughter.]

Nonetheless, it certainly is fast when you are talking about a ship large enough for the strategic sealift mission carrying 5,000 tons of equipment, and doing that over vast expanses of ocean. That type of fast sealift is an untried and unproven concept, and we must continue to try and prove this concept and also to find out what the cost tradeoffs are for that. The cost of developing this capability is obviously very, very high.

And our efforts in this area must be aimed at developing a capability which has commercial, economic feasibility.

Laid-up ships, doing nothing, standing by waiting, produce nothing for this country and contribute nothing to the problem of declining numbers of skilled merchant marines.

The point is, if we can have something in this country of ours that is commercially viable, the good old economic system we have, call it capitalism, will take hold and I will have enough ships at my beck and call in wartime to do the job I need.

R&D efforts, such as the surface effect ship, must continue. We must examine options such as monohull—semi-planning monohull, surface effects design and several of the excellent ideas that Dr. Costello has suggested to us.

Our long suits in this country are two things, and I think you mentioned them, Senator: Our people and our technology. We are exploiting neither in the maritime world today.

We must examine propulsion, difficulties in seakeeping with different kinds of propulsion, and once again, commercial feasibility. We must have commercial feasibility.

An initiative, I believe, with great merit, is the National Shipbuilding Research Program. This program needs continued support. Its purpose was to develop commercially competitive U.S. ships for the future. It uses R&D as the springboard for competitiveness. And we must get our Merchant Marine back in the competitive business. It is a very, very good industry.

Funding for the program has been through cost-shared contracts between sponsoring shipyards and the U.S. Government. However, Government funding has decreased from about $4.4 million of joint MARAD Navy funds from 1982 to 1985, to less than $500,000, and this is projected to decrease further in 1990.

And I need not tell you about the amount of business commercial shipping companies give to our commercial ship building companies today. We are not building any ocean-going commercial ships today for the first time in our country's history.

At the same time, there is an interesting phenomenon going on that we must not ignore because I think in it lies the solution. There are strong, positive indications that there will be an upturn, a dramatic upturn, in world shipbuilding orders in the 1990s which will most probably continue through the 21st century.

Everything we see in air cargo and sea cargo is going up exponentially. At the same time, our market share is going down. And that is un-American. Our market share should be going up. In that, I believe, lies the solution.

If the United States does not modernize shipbuilding and ship operations through research and development and technology, the world will pass us by.

America has always been in the forefront of maritime innovation. The roll on/roll off concept which is used today and containerization were both started in this country; and everybody has picked it up and grabbed our market share by using our very own ideas. That is wrong.

I strongly support a dedicated R&D effort to improve speed, efficiency, and cargo-tracking capability of shipping. The key to making this affordable and feasible is to aim our efforts at commercially viable options.

I think we spend far too much time asking how we are going to afford it, rather than building a strategy, indeed, that we can afford.

Finally, turning to the issue of how to increase the Nation's total strategic sealift capability, it has been suggested that we build more SL-7s. I find that notion foreign to my thoughts quite frankly. I think we should get on and design and build other ships that have commercial viability. To build more SL-7s today would be an enormous cost, and I think we would be taking a step backwards.

Would I like to have more SL-7s? You bet, sir. I really would. They are a great and wonderful ship. Standing on the bridge of an SL-7, looking out at the equipment that you can put on it and take off is something to behold. Nonetheless, building more at this time is not the solution.

The better solution is simply to revitalize the Merchant Marine of the United States. First, our country must recognize that there is a serious problem, and we have not done that yet.

The first step is approval of a National Sealift Policy, which Dr. Bob Costello helped me get through the Department of Defense, and it sits in the White House now. We have got a lot of support for that.

For the first time we have industry, labor, and several agencies of the Government together as a coalition to support a National Sealift Policy. We must have that to begin with.

I have discussed that policy with both Secretary Cheney and Secretary Skinner, and with a number of other people.

We have a coalition of effort involving lots of people now to do this and to get the sealift policy going.

The key is to increase the amount of our own imports and exports carried on U.S. ships. Today we carry only about 4 percent of our own trade on U.S. ships, and we must increase that. Just imagine what it would be like to increase it just to 8 percent. Just my basic math would say we would double the number of ships that I would have available to me in time of a crisis.

We must also make better use of what we are doing, better use of container ships for military unit equipment. We will work that.

Continue to support local plans to streamline port and rail, and we are doing that.

Provide incentives to U.S. ship owners and consider revising some regulations as Dr. Costello has talked about. I applaud those ideas and I think we should continue it.

In conclusion, Mr. Chairman, I am convinced that the only practical solution to the total sealift problem is to improve the health of the U.S. Merchant Marine. And anything we do to the positive would improve the health of that industry.

That will require a national coalition, and I think we are well underway to that national coalition now. For the first time, we can sit down and produce the ideas and papers from an industry-wide effort.

We need a fresh look at the way this Nation carries out its maritime role. Its policies, regulations, legislation, subsidies, incentives, cargo preference, all must be looked at; and if necessary, we must change them. And sometimes this will be tough, but let us strap it on and do it. This is essential if the Merchant Marine is to continue to be the Nation's fourth arm of defense, and we must have it as that.

Thank you very much.

[The prepared statement of General Cassidy follows:]

STATEMENT OF
GENERAL DUANE H. CASSIDY
COMMANDER IN CHIEF
UNITED STATES TRANSPORTATION COMMAND

Mr Chairman and distinguished committee members, I welcome this opportunity to appear before you again. I look forward to continuing our discussion of those mobility issues we could not fully explore during my appearance at the full SASC committee hearing in April.

I realize many of you are familiar with the United States Transportation Command but for those who may not, permit me to briefly describe our command. We exercise operational command over common-user forces within three distinct component commands: Military Airlift Command, Military Sealift Command, and Military Traffic Management Command. The combined 182,000 active, reserve, national guard and civilian personnel provide the global air, sea, and land transportation to deploy, employ, and sustain US forces worldwide. Of particular note is the dominant role the civilian transportation sector plays in our business. We depend on the civil sector for over 70 percent of the nation's strategic lift capability during wartime. While this dependency does have its challenges, the following discussion of strategic sealift will reveal that this arrangement offers significant practical advantages.

AN INTEGRATED MOBILITY STRATEGY

It is my understanding that the focus of this session is Fast Sealift Ships. I would like to point out that while I am an advocate for reversing the growing sealift shortfall, as CINCTRANS, I am concerned with improving the entire mobility equation from origin to destination, wherever that may be. This will require expanding technology across the spectrum of all elements of the transportation process. Strategic sealift is but one of many parts of a balanced mobility equation. Each element offers its unique and essential features. As an example, airlift, historically and correctly, features an organic, active nucleus that gives us the flexibility for immediate response across the entire spectrum of conflict. Airlift swiftly augments our forward deployed forces. It does so by quickly projecting our CONUS deployed forces into the theaters of operations to link up with prepositioned equipment. We've made great progress in airlift capability by following the direction contained in the National Airlift Policy and the US Air Force Airlift Master Plan. With the C-17 now in production, we can anticipate significant progress toward achieving the Congressionally Mandated Mobility Study (CMMS) directed 66MTM/D airlift goal.

Prepositioned equipment, both land-based (POMCUS) and afloat, along with port terminals and strategic sealift, complete the strategic mobility picture. Each has unique benefits, for example, afloat prepositioned equipment offers an important additional advantage of mobility and alternatives to host nation support constraints.

I believe it important to briefly mention each of these mobility elements because they are interdependent. If part of the equation is out of balance it can naturally effect the entire equation. Any discussion of fast sealift should be addressed with this relationship in mind.

THE US MARITIME AND STRATEGIC SEALIFT PROBLEM

I have learned, since assuming command of USTRANSCOM, that sealift is a non-organic defense force. Historically, our sealift strategy has been to rely on the merchant marine which has a long, proud tradition of wartime service to this nation both in support of national defense and support of the wartime economy. The Merchant Marine Acts of 1904 and 1936 codified the need to preserve a robust merchant marine. Certainly, we all agree on the need for a strong strategic sealift capability, and we should not lose sight of its unique role in the mobility mix. The strength of sealift lies in its enormous capability to support large scale, sustained operations. Strategic sealift concerns today address three basic areas: first, new technology to improve efficiency of shipping, speed, crew size, cargo tracking; next, sufficient shipping capacity for meeting the initial requirement to move a unit organic, outsized and bulky equipment; finally, adequate shipping to carry ammo, fuel, and supplies to sustain the force for a protracted period of time. I will speak to each of these areas.

Fast sealift technology, as envisioned, offers an alternative to solving a portion of the strategic lift equation. Since this concept is untried and unproven, and because of the cost involved, it is vitally important to start now on the research and development phase of the options proposed, whether it be of monohull, semi-planing, or surface effect design. In my advocacy role, as a supporting unified commander, I will continue to work with the Navy and Maritime Administration to urge an R&D effort for determining options that will be cost-effective and work. I believe that difficulties in propulsion, seakeeping, and commercial economic feasibility for a fast sealift design can be overcome only through a dedicated fast sealift R&D program.

One specific initiative within research and development is being taken by the Society of Naval Architects and Marine Engineers. As part of the National Shipbuilding Research Program, their Ship Design Committee intends to propose a national workshop aimed at developing commercially competitive US ships of the future. Their stated overall intent is not just to catch up to significant technological advances and economic considerations but to use the R&D as a springboard to future competitiveness. Funding, as always, is vital to program success. Funding the National Shipbuilding Research Program over the last 15 years has been accomplished by means of cost-shared contracts. The Maritime Administration initially funded all efforts along with the sponsoring shipyards. The Navy provided matching funds of about $2 million between 1982 and 1985, totaling the research fund to as much as $4.4 million per year. By 1986 however, drastic cuts in MARAD left the Navy to shoulder the burden alone. Today, even though the contracts are still between MARAD and the sponsoring shipyards, the National Ship Research Program has essentially become a Navy program. Its funding is now less than $500K and is projected to go lower in FY90. The loss of fundina for programs like this are of concern to me. There needs to be investments in programs like the National Ship Research Program to keep R&D alive within the industry. We should not, however, spend R&D on such ships if it should become apparent they would not be economically viable in our merchant marine.

The importance of design and production planning with any new ship-type and in particular, fast sealift, must be cohesively linked with its research and development. Action is required very soon and must be taken before the nation loses the capability to build the fast sealift ship designs we may envision. Reinvigorating the National Shipbuilding Research Program may be the needed means to bring R&D back into the commercial sealift arena. It is often said that for every dollar spent on R&D, the return is 5-7 times greater over the long haul. There are indications that the mid-90s will see a revival in world shipbuilding orders which will continue well into the 21st century. For example, some foreign nations have already invested substantial sums in sealift R&D. Indications are that the investments of West Germany and Japan, in particular, could total in the hundreds of millions of dollars. If this country's commercial shipbuilding industry is not modernized through technology and R&D and we do not have new competitive ship designs, we will watch the parade pass us by. We were in the forefront of developing the roll-on/roll-off ship and the container ship which have changed the shipping industry the world over. We must be able to continue to develop new shipbuilding technology, new ship design, and propulsion systems and once again be a trend setter, not a follower. It's just good business sense to me.

The US shipbuilding industry will also benefit significantly from a substantial effort in research and development. The investment in new commercial sealift alone could ultimately provide a portion of the revitalization necessary for our shipyards. Both government and industry must participate. When enough R&D has been accomplished to determine essential ship design features, along with their commercial use, then the forecasted revival in world shipbuilding orders could be exploited. Once again, the future benefits of the new technology await our action.

Putting new ship technology aside, let me focus on the here and now. A problem exists in meeting these strategic sealift needs. The question is how to fix it. One option is building more Fast Sealift Ships like the eight SL-7s we currently own - I disagree with that option on a continuing basis. Those eight ships represented a one-time, excellent opportunity to buy some commercially noncompetitive fast ships from the Sealand Company that could be purchased and converted into highly military useful ships at the relatively inexpensive cost of about $105M per ship. It is estimated that construction of comparable ships today in the US would cost in the range of $300M to $400M per ship. These costs could prove prohibitive in the current budget environment. Building or buying more ships to lay up waiting for a crisis is both expensive and brings with it other risks. That solution does little for the health of the industry.

An enlarged fast sealift ship fleet, bought and stored at taxpayer expense in the Ready Reserve Force (RRF), is an unnecessarily costly investment. Therefore, the commercial applications for sealift need to be inherently linked to the R&D effort and complement national defense needs for sealift.

A BETTER ALTERNATIVE

Historically, and more recently since World War II, we have relied on the US flag merchant marine industry for both economic and national defense purposes. It wasn't until the 1980s, when the decline in the merchant marine jeopardized security, that DOD began to expend dollars to buy the fast sealift ships, increase the number of ships in the RRF, and purchase sealift enhancements such as seasheds and flatracks. These expenditures have done nothing for the merchant marine, it has continued it's precipitous decline.

The first step in solving the sealift problem is to recognize we have a national problem with the merchant marine industry. I think the National Sealift Policy, if approved by the President, would be the first step in recognizing this national problem. It is going to take a coalition of effort on the part of most executive departments of the government, the industry, and the Congress to come to grips with revitalizing this industry to make it genuinely competitive with foreign shipping and shipbuilding concerns. The key is to increase the amount of our own imports and exports that is carried on US flag ships. Cargo is the lifeblood of this industry and, as you may know, we are only carrying approximately 4 percent of our own imports and exports. A greater market share would go a long way towards revitalizing the industry.

In addition, as we move to revive the US maritime industry, we are looking at smarter ways to use what's available to us now. For instance, we are looking at better ways to use commercial container ships for unit equipment, streamline port and rail depot reception and discharge operations, and offer incentives to US shipowners. These incentives may need to include consideration for possibly changing regulatory procedures and other measures that the federal government deems for the common good. The objective is to provide a benefit of real incentives for all US shipowners in committing their resources to national defense. Furthermore, let's sustain the progress we've made to this point by supporting those DOD programs already in place. The 8 FSS, the RRF (including Auxiliary Crane Ships), and the afloat prepositioning force provide significant lift capability. Modernization efforts to improve the military utility of commercial vessels such as seasheds, flatracks, improved cargo discharge systems, and logistics over the shore (LOTS) operations certainly make us better able to support the warfighting CINCS.

CONCLUSION

I am convinced the most practical and least costly solution to the total sealift problem is a viable US merchant marine. However, it is not a unilateral DOD problem. It is a national problem. The solution requires a national coalition of the Departments of Defense, Transportation, Commerce, and State, Congress, and the maritime industry itself. That coalition will have to take a fresh, hard look at the way this nation's maritime industry does business. Policies, legislation, subsidies, incentives, cargo preference - all will have to be looked at, and if necessary changed, if we are to recapture our fair share of the world's shipping trade. While trade is important, it is essential we have the capability to build the ships needed, not only for trade, but also for national defense. Fast sealift may be part of the solution and should be deliberately pursued with dedicated research and development of design, propulsion, and commercial feasibility. Our military strength depends upon the vitality of our economy. A US national security objective as defined by President Reagan, in a report to Congress in early 1988, stated, "Respond to the challenges of a global economy by heeding economic factors that affect our national security...." As recently as 25 Apr 89, Admiral Crowe said to the HASC, "...America has no real choice between economic security and military security." Nowhere is this relationship more evident than in the US maritime industry. We must move forward to renew its vigor and restore it to its traditional position as an active partner in this nation's defense forces.

Senator **KENNEDY**. Admiral Arthur.

STATEMENT OF VICE ADM. STANLEY R. ARTHUR, U.S. NAVY, DEPUTY CHIEF OF NAVAL OPERATIONS FOR LOGISTICS

Admiral **ARTHUR**. Mr. Chairman, it is a pleasure to be here with you and the distinguished members of the committee. I have a prepared statement that I would like to enter into the record, and I will go ahead and summarize some of that.

Senator **KENNEDY**. It will be included in its entirety as if read.

Admiral **ARTHUR**. Thank you, sir. In that statement I provided some details relative to our sealift capabilities. I believe, in general, that the Navy can take considerable credit for stepping up to the challenge of providing strategic sealift.

In a relatively short period of time, we have been able to exceed what we call our real requirement: meeting the Defense Guidance goals in two of the three areas pertaining to strategic sealift. We exceed our capability to move containerized sustainment equipment, and also exceed our capability to provide petroleum products.

However, we do have a shortfall in our ability to surge the unit equipment, and right now that shortfall is about 19 percent short of our goal—all in all a reasonably good report for this period in time.

I am sure you and the members recognize that unit equipment is really the key issue. Unit equipment provides the war-fighting machines that the CINC needs, and he wants them early on. Thus, we have the continuing interest in how we are going to continue to close the gap on the remaining percentage of our capability.

If we turn our hats around and take a look at what resides in the commercial sector, we find that commercial business, as was alluded to earlier, has been moving away from those platforms that are very useful in hauling the outsize cargo which unit equipment represents.

The modern container ships now involved in intermodal operations are tremendously great assets for us to use in sustainment. In other words, by being able to put cargo into boxes, they provide a magnificent capability. However, they have little capability to carry the unit equipment, other than what we can provide by sea sheds or flat racks. Thus, we see a dwindling market of useful ships in trade at this time.

That is one of the reasons we have continued the growth of the RRF to ensure that we place into that force those militarily useful ships that do become available from the commercial sector.

Although MARAD now has the funding line associated with the acquisition of those ships, we continue to work very closely with them to ensure that our requirements are properly articulated, and also to help them with their budget requests.

If the RRF is allowed to grow to the design level that we forecasted, 142 ships by 1994, I would predict that our surge lift capacity will change very little. We should not lose any ground. In fact, we should gain maybe two or three percentage points, but we are not going to close the gap to be able to carry 100 percent.

We do have a concern, however, in the number of container ships. Although we do have some nice modern ones, the numbers are starting to dwindle, as well as the numbers of our NATO allies who are involved in the commercial trade. Their ships are also declining in numbers. Thus we certainly endorse the recent initiatives relative to a National Sealift Policy. It could not be more timely.

The RRF provides us a wonderful safety net, but it does not provide the full support necessary for a healthy industry. That industry must have the infrastructure that a viable sailing commercial fleet provides.

We need ships at sea to provide trained, qualified and current mariners, as well as to support the shipbuilding and ship repair base.

In this austere funding climate that we are entering, we see that prioritization of our Navy's requirements will be an extremely critical item. Debate on where our next dollar will be spent, whether on amphibious shipping, ASW platforms, et cetera, will prove to be interesting.

My job on the OPNAV staff is to make sure that the Navy maintains strategic sealift within that balanced program, and I look forward to the challenges ahead.

Thank you very much, sir.

[The prepared statement of Vice Admiral Arthur follows:]

STATEMENT OF

VICE ADMIRAL STANLEY R. ARTHUR, U.S.NAVY
DEPUTY CHIEF OF NAVAL OPERATIONS
FOR LOGISTICS

Good morning Mr. Chairman, distinguished committee members, ladies and gentlemen. I'd like to thank you for this opportunity to appear before your Committee today to discuss our Navy's strategic sealift program. It is my intention to provide you a historical perspective on how and why we've arrived at our present capabilities and what the future may hold.

We in the Navy have the responsibility to provide the strategic sealift assets that will be used to deploy 95 percent of the dry cargo and 99 percent of the petroleum products required to equip and support our armed forces in a major contingency. Along with airlift and prepositioning, the other aspects of the mobility triad, sealift delivers to our warfighting CINCs the where-with-all to meet the opposition and deter or if necessary engage them in conflict and win.

To evaluate how well the Navy is meeting its sealift responsibility, we must examine the requirements in detail and then the assets we have to meet those requirements. The goals or requirements are established by the Secretary of Defense and set forth in the mobility section of the Defense Guidance (DG). Sealift is unique in that, until recently, the United States has depended almost exclusively upon assets sourced outside the Navy to meet these goals and requirements, specifically, the ships and personnel of the U.S. Merchant Marine and those of our allies. This reliance on the commercial maritime sector to meet the military sealift requirement has been the policy of this nation since its inception and was most recently affirmed by the Merchant Marine

Act of 1936 as amended.

The Defense Guidance describes the primary strategic sealift requirements in terms of short tons of surge unit equipment lift capability, short tons of containerizable sustainment shipping lift capability and numbers of handy-size tanker equivalents required for petroleum products. These requirements were developed based on JCS/OSD mobility studies: the key of which were the Congressionally Mandated Mobility Study issued in 1981, the DOD Sealift Study issued in 1984, the Ready Reserve Force/ Container-Mod Ship Sizing Study of 1985, and the Sealift Tanker Study of 1985. These studies established an appropriate balance of prepositioning, airlift and sealift to meet our warfighting commanders' deployment needs.

When we compare current capabilities against the existing requirements, our analysis shows that in containerized sustainment and POL shipping, we are ahead of the goals set in the Defense Guidance. In the third category, that of unit equipment surge shipping, we are as of today only 19 percent short of the established goal. I would be remiss, however, if I did not point out that ongoing and recently completed mobility studies undertaken to validate and update previous requirements are indicating that increased lift capacities may be required if we are to continue to use a national strategy of flexible response and forward defense. These studies have yet to be reviewed in the cold light of fiscal reality but there is a strong possibility that we will be faced with increased requirements concurrent with a declining merchant marine and very austere budget considerations.

We have achieved existing levels largely as the result of Navy sponsored strategic sealift support programs which were started in the early eighties. We reluctantly embarked on these programs since we saw no other way to compensate for the projected decline in U.S. Flag sealift capability, particularly in unit equipment capable ships, such as roll-on/roll-off ships, breakbulkers, and barge ships as well as in product tankers.

The majority of our funding has been spent in the area of unit equipment surge sealift capability. Unit equipment consists of the wheeled and tracked vehicles, helicopters and artillery that must flesh out our in place units and marry up with air-lifted personnel to constitute our deterrent forces. Without sufficient surge capability, forward defense and reinforcement strategies are hollow terms. Unit equipment is for the most part not suitable for transporting in the containerships that make up the bulk of our active merchant fleet. An M1A1 tank or a combat helicopter simply does not fit in a shipping container. But, pure containerships currently make up 64 percent of our U.S. Flag liner fleet and are projected to make up 72 percent of the fleet by the end of 1989. To surge unit equipment overseas we need breakbulk ships, roll-on/roll-off ships, barge-carriers or modified containerships capable of carrying oversized equipments.

Unfortunately, these types of unit equipment capable ships are not commercially competitive with the intermodal container-ships that have practically taken over international liner shipping. Only 48 breakbulk, container/breakbulk or RO/RO ships are active in the U.S. Flag fleet today. To offset the loss of this capability in our merchant marine, the Navy initiated a group of programs designed to enhance our surge unit equipment shipping capability. These programs included the upgrade of part of the NDRF to form the basis of the Ready Reserve Force, the creation of the Fast Sealift Ship Squadron, and the construction of RRF crane ships as well as the adoption of a seasheds/flatrack containership conversion system.

Initially, the Ready Reserve Force or RRF was to consist of 30 upgraded Victory ships. However, the decline of the U.S. Merchant Marine over time has required us to continually expand the RRF non-containerized dry cargo and tanker fleets. In fact, today the RRF consists of 92 ships and is programmed to grow to 142 ships by 1994. At that time, it will contain 104 unit equipment capable ships, 36 tankers, and two troop ships.

The Navy has spent almost a billion dollars on the acquisition and maintenance of the RRF through 1988. By OMB decision, responsibility for RRF funding shifted to the Department of Transportation's Maritime Administration as of this fiscal year. Based on our Memorandum of Understanding, Navy is working closely with MARAD to ensure that their RRF budget requests meet our RRF size and readiness requirements. It is critical that the Maritime Administration be funded both to continue the programmed growth of the RRF and to maintain the physical condition and readiness status of the ships already in the program. The surge unit equipment lift capacity resident in the RRF is key to our defense strategy.

Our Fast Sealift Ship or FSS force consists of eight ex-SL7 class containerships that were purchased and converted into RO/ROs for military use. These fast, thirty plus knot ships, give us the capability to rapidly deploy the fighting equipment and a slice of the corps support for an Army armored division. This program was purchased for over $825 million dollars and has cost approximately $120 million to date to maintain these ships in their present high state of readiness. Operation and maintenance costs will continue to average approximately $40 million a year.

We are purchasing sufficient seashed systems under our seasheds/flatrack program to create twenty-five ship sets of hardware that will permit containerships to carry unit equipment. We will complete program buy out this year at an aggregate cost of $191 million dollars or over $7M per ship. Currently on hand assets, once the ships are outfitted, would provide 6.4 percent of our unit equipment lift capability. This will grow to 16.5 percent by 1992 as the remaining systems in the program are delivered. While each of these ship sets will effectively convert a containership to carry heavy and outsized unit equipment, we must recognize that this stopgap measure involves significant fiscal and opportunity costs. We not only have the costs of purchasing and storing the seasheds and modifying the ships to accept them but we must also consider that the ship is lost to the reinforcement process for approximately five days while it is being converted and that a ship being used for surge unit equipment is no longer available for containerized sustainment shipping. Additionally there will be further delays while the ship's containerized cargo is frustrated at a container port, the ship sails to a repair facility for modification, sails to the seashed storage port to pick up the seasheds, and then finally sails to the loading port. In short, seasheds fill a definite need but their use must be kept to a bare minimum to support our peak movement requirements.

Additionally to insure that our non-self sustaining container ships can be offloaded in the stream or through undeveloped or damaged ports, Navy invested over $200 million in converting ten merchant hulls into crane ships (TACS). Since these crane ships are part of the RRF, they are now a MARAD funding and maintenance responsibility. MARAD has included one crane ship in its FY 90 budget request and is planning to request funding for another conversion in FY 91 to complete the original twelve ship program.

Ancillary to our emphasis on surge unit equipment shipping, we have funded two afloat mobility enhancement prepositioning programs which to date have cost approximately $2.8 billion dollars. Afloat prepositioning provides greater mobility and flexibility than shore based prepositioning and it is less vulnerable. Also afloat prepo is a necessity when host country support or access is not available. Our principal effort here is the Maritime Prepositioning Ship (MPS) program. Through it, we have constructed or converted 13 ships, constituting them into three MPS Squadrons, forward deployed in the Indian Ocean at Diego Garcia, in the Pacific in the Guam/Tinian area, and afloat in the Atlantic. Each squadron carries the equipment and supplies to outfit and support a Marine Expeditionary Brigade of 16,500 men for thirty days. Pre-loaded, these ships are capable of moving forward to a benign environment close to a troubled area where they will marry up their equipment with air lifted personnel. It will continue to cost about $325 million a year to maintain this highly mobile and flexible readiness capability.

Our twelve Afloat Prepositioning ships are located in the Indian Ocean, Pacific and Mediterranean Sea. Fully manned and preloaded with key Army, Air Force and Navy equipments and supplies, these ships would be amongst the first to arrive in a contingency situation. Although the Navy presently fully funds this program, a recent OSD decision assigns outyear funding for these units to the service or agency that has equipment stored on the individual ships. This "user pays" decision will reduce Navy's annual costs for this program to about $7 million a year. Navy will continue to act as the executive agent, obtaining ships for use by the other services and administering the program.

In addition to the above, Navy has also converted several merchant hulls into ships capable of meeting unique requirements. Once converted, we have continued to maintain these ships in a high state of readiness. Specific examples include the two TAVBs which will carry the equipment necessary to establish two USMC Intermediate Air Maintenance Facilities in the field and two TAH hospital ships, each of which provides a one thousand bed hospital capable of deploying to a forward area.

Another area in which the Navy has significantly improved its capability is the delivery of bulk petroleum products ashore in areas where no port facilities exist or where port facilities have been damaged. In 1987, the Navy accepted the mission to provide bulk petroleum to the high water mark for all services. In a joint effort with the Army, nearly $100 million dollars has been invested in the Offshore Petroleum Discharge System, which allows specially configured tankers to discharge over a million gallons of fuel per day from up to four miles offshore to support expeditionary forces operating ashore. We have also spent over $380 million dollars on other sealift enhancement features, communications equipment and ship to shore cargo delivery systems.

Fortunately, our petroleum product lift requirement is such that only a modest investment in tankers for the RRF has been necessary to meet our goal for the next few years. By the same token, sufficient sustainment shipping lift capacity is currently available in the U.S. Merchant Marine containership inventory to satisfy Defense Guidance requirements.

In the aggregate, the majority of our almost 7 billion dollar investment in sealift programs has gone towards substituting government assets for losses of unit equipment capability in the civil sector. While we have not achieved our Defense Guidance goal for surge unit equipment lift capacity, our present capabilities are good if not excellent. The key operative term here is "present". I share with the Commission on Merchant Marine and Defense their concern for the future. The continued decline of the U.S. merchant marine will, in the long run, place in jeopardy our ability to support our Combat Commanders.

We do not expect that our surge lift capacity will decline greatly in the future since most of this capability is now being provided from U.S. government sources. In fact the RRF and MSC fleets coupled with our seashed and flatrack program will account for over eighty percent of the available surge lift capacity by 1992. POL lift is presently adequate but the projected decline in the number of military useful oceangoing tankers requires further investment in tanker tonnage. Acquisition of tankers is programmed for the RRF to maintain the status quo as old tankers are retired. The continued decline in containership numbers, however, not only portends a decrease in our sustainment shipping capacity but also reduces the number of containerships available to receive the seashed/flatrack modifications that will permit them to carry surge equipment. U.S. containership inventories are marginal at present and their continued projected decline is of major concern to the Department of Defense.

Given the projected commercial maritime environment, it has become critical that a strong National Sealift Policy be adopted that results in an active civil fleet of cost competitive intermodal ships. These ships are critical to the defense of our nation and provide the only means of meeting sealift requirements for sustainability cargoes. We need these ships operating at sea to provide the manpower and training base for manning the inactive ships as well as to maintain a productive industrial base. Navy and Department of Defense frustration at our inability to reverse the decline of our merchant marine industry, brought on by economic forces beyond our control, resulted in our efforts to escalate the problem to the National Security Council. The Navy fully supports and intends to participate in efforts to develop and promulgate a National Sealift Policy.

While we are discussing the future, I would like to take the time to touch on what we in the Navy perceive as a major and possibly misplaced effort to obtain more fast sealift. The Secretary of the Navy has recently submitted to Congress the Fast Sealift Technology Assessment Report drafted under the Chairmanship of the Naval Sea Systems Command. As described in that report, fast sealift represented by either the surface effect ship in the fifty plus knot category or by the semi-planing monohull in the 40 knot category cannot be realized in the near term due to extensive research and development requirements. Conventional hull fast sealift of the thirty to thirty five knot range can be developed relatively quickly if we are willing to pay the price. While it is obvious that faster sealift ships will deliver cargoes earlier, the results of OSD/JCS sponsored analysis must be awaited to determine where we can get the greatest return or improvement in delivery for the application of our scarce mobility resources.

Although most of the CINCs have complained of insufficient fast sealift, they are really concerned about late deliveries of equipment and material. However, when we examine the entire mobility equation, from the Fort to the Foxhole, we find numerous interrelationships and dependencies - numerous options and opportunities for improvement in delivery times. For example, ocean transit constitutes roughly a third of the mobility timeline to Europe. Thirty five knot fast sealift reduces transit times and fifty five knots cuts them further, but the savings are in hours or at the best a few days and effect only the at sea transit portion of the mobility equation. We need vigorous, cost and risk trade off analysis of all possible options towards improving force closures to guide our funding priorities and identify the most effective means of supporting our troops in the field.

In summarization, I feel that Navy has on the whole done well towards meeting Strategic Sealift's current requirements but like yourselves, I have some obvious concerns about our future capabilities. The requirements appear to be growing, the available assets diminishing and the fiscal environment definitely becoming tighter. If we are to meet our commitments and maintain a capability to support a forward defense strategy, we must continually track the situation and support every legitimate effort to enhance the merchant marine industry on which we depend for support. A robust merchant marine is key to our defense strategy.

Senators, thank you for your time. This concludes my formal statement.

Senator KENNEDY. Mr. Pyatt, we are glad to have you back and look forward to your testimony.

STATEMENT OF EVERETT PYATT, ASSISTANT SECRETARY OF THE NAVY (SHIPBUILDING AND LOGISTICS)

Mr. PYATT. Thank you, sir. I have a prepared statement I would like to enter for the record, if I may, and summarize it.

Senator KENNEDY. It will be included in its entirety.

Mr. PYATT. One of the advantages of being last is that I can respond to some earlier statements, if that is acceptable to the Chairman.

First, I would like to respond to an issue on quality that my good friend raised.

A few days ago I had the pleasure of going to the President's Award for Quality in Government Operations. The only people there were people from within Government. The only winners from the military departments were the Navy. There were three awards. One for the Norfolk Navy Shipyard, one for the Forms and Publication Printing Service, and one for the Naval Air Systems Command, the President's Awards.

So we do take some great pride in that of our efforts of our people in producing quality products, and when an independent group looked around the Government, I was proud to find they picked only Navy. So I have some parochialism, but I am proud of it.

Regarding the issue of the Transportation Command which was alluded to was frustrated by the Navy, I did not know we had that much power. But it was because they did not have it right, they did not have the Air Force included. Finally, Goldwater-Nichols got it right. We are doing everything we can to support that command.

I think General Cassidy has done a superb job in bringing together the elements, the important elements of transportation to make a truly integrated transportation network.

The Sealift Policy Initiative has been alluded to this morning. The first drafts were created in Admiral Arthur's office, sent through the system by the Navy. We believe it is an important step in getting the executive branch coordinated. We hope to be able to continue.

Issues of radical change. Radical change, I believe, is impossible in Washington, no matter what the field. And we talked about one at our last hearing, the SWATH program, which I would like to come back to, because it is, in many respects, an issue of radical change.

Here was a concept, invented by Americans, taken over by the Japanese. The first significant applicator was a Japanese ship. We discovered we had a particular application for submarine surveillance, using this ship, because it could go in the northern latitudes where the water is rough.

We built a ship, started building a ship, people in Congress gave us strong support as we explained why. But now I am faced with an IG study, not complimentary to the Navy, for taking this untoward initiative toward the exploitation of technical applications.

So the frustration that we feel as a manager, where we try to move out, on the other hand, we have somebody saying you are spending your money unwisely. Even after very extensive model tests and very extensive engineering analysis, we are still faced with this kind of problem.

They would rather wait several years until we complete testing of the first ship, at which time we would build some more.

So it is these balances that one has to strike all the time. I think we do it right; others disagree.

Issues were raised regarding shipyard efficiency. Nobody in the world builds war ships any more efficiently on manhour basis than the United States. Two of the yards that do this are represented by members on this committee, and I think they are a true industrial marvel. People have taken, and again, this was forced by a competitive environment that got away from sole-source negotiations and made managers be creative.

When the Japanese decided to build destroyers, we could have sold them those ships for about $200 million a ship less than they are going to pay all up. They chose not to do it. I think it is unfortunate, because they could have gotten more ships for the amount of money. That was their policy decision.

Now, I would like to turn to another issue that has been alluded to this morning: Navy priorities. It has been clear, I think in earlier testimony by both sides, civilian and military side of the Navy, that maintaining a strong, combatant force is our number one priority. Without this ability to defend against submarines, the issues that Senator Cohen raised, sealift would mean nothing.

I think it is very, very important to keep that perspective as we talk about some of these other issues.

Another very important fact, commercial fact, is that the role of the Merchant Marine is changing. The Merchant Marine has changed in the last decade or decade and a half, from a break bulk fleet, where you put each little package on the ship independently to a containerized multi-modal operation.

This multi-modal operation, I think, Americans began, before anybody else, to deliver service ahead of anybody else. Point-to-point service.

I have talked to managers of department stores who want to know where every box is, because they want those spring dresses in the spring and not in the fall. And they know where every box is.

And our people have beat out the competition on service. I think that is an important thing.

But in this changing environment—container ships are not as useful in military operations as are RO ROs. RO ROs are the kinds of ships one needs to move, the initial move of heavy equipment—the reason the SL–7s were converted from container ships to RO ROs.

The reason we went out on the RRF and we decided to make purchases, and we were lucky enough to find a little glitch in the market where they could not use the ships. Congress gave us the money, we walked in and bought five almost-new ships at bargain-basement prices. In this whole effort, we have added about a division's worth of lift.

In looking ahead at the future, I believe that the, nothing is going to change in military equipment. RO ROs will continue to be what we need. There is virtually no commercial market for RO ROs capable of carrying heavy equipment such as the military has. There are a lot of car carriers around, most not useful for this role. They have to be strongly discounted.

So when you think about various policies, one needs to differentiate between the kinds of cargo we carry. Container ships are very good for moving sustaining cargo point to point. And the work that General Cassidy's group has done has, I think, maximized that utility of moving from a port in the United States to a port wherever in the world they are going.

One of the other things about commercial viability, as we worked with the Merchant Marine Commission, is really what I categorize as the lack of access for our shippers. The number that was mentioned, 4 percent, this morning, I do not dispute it. But what has happened, when people, particularly from the Far East, move things to the United States, they tend to give an all-up price; our people do not get much of a chance to compete for that business, and are virtually locked out.

That is my impression. You may wish to talk to liner operators and see if it is theirs.

So this is the environment we are dealing with. And the question about high-speed and commercial viability, the SL–7s are efficient ships for what they were. They were taken out of service because people decided the speed was not worth it. The people who were paying to have it moved would just as soon have a little slower speed and a lot less price. And that is what drove them out of existence. And I do not see anything around changing that formula, particularly with fuel becoming more expensive.

The important thing was certainty. They wanted to know when something was arriving so they could put it on sale when they got it. And without that certainty, the whole picture began to change.

I would like to go on now to my prepared remarks.

I think the key element is that 90 percent of our war materials and about 99 percent of our fuel go in ships, in any kind of scenario that I recall. And this is the reason it is so important. You have talked about airlift already; I will skip it. It is the beginning edge which has to be supported later.

The Navy has undertaken quite a bit in trying to improve our sealift capacity. You mentioned the 13 prepositioning ships which we have Marine equipment in now. These are very flexible. Ships can be deployed to areas of interest and be there should the need arise. They are split up in, I think, three different locations around the world.

We talked about the conversion of providing the racks that would allow container ships to be converted. That is a Navy initiative; 25 ship sets have been procured. OSD said that is enough, and we plan to quit.

Those are a few of the items.

But I think understanding sealift and its role in an overall transportation system, on page 2, I listed 18 different events that have to occur in moving from point A to point B. And you put them down because sometimes people tend to skip over this and focus on simply the ocean transportation segment, and there is really more of it, as we can show in a couple of examples; which I will first say, these are notional examples; it all depends from where you start and where you end. But I think it helps to understand the problems of the payoffs of different kinds of pieces of equipment.

Mode change means changing from one form of transportation to another. The first example we have is assuming a 40-mile-per-hour land transit and 20-knot sea transit, it would take about 400 hours to move from Kansas to Europe. We picked Kansas because it is in the middle of the country, Fort Riley. Mode changes were 168 hours, land transit 35 hours, sea transit 200 hours, for a total of 400 hours.

Simply by moving from a 20-knot ship to a 30-knot ship could reduce the time by 67 hours. That is the payoff of that one change.

Moving to a 50-knot sealift capability, we drop another 53 hours in that overall transportation segment. And a 50-knot sealift capability, I want to assure you, is a tough technological job. We gave you a study on it performed by our best people. Admiral MacKinnon, the project leader, is here. It is a struggle.

Just as another example, we gave you the impact of prepositioning. Put the equipment on board ships and store it there. It may be an option coming up in the future. We have the experience of doing it with the Marine equipment; it has worked out well.

That brings the overall time down to about 100 hours, because you can put the ships, sort of, where you think you might need them. If you decide to leave them in the CONUS, it is a little longer. But I found this little table here a useful instruction, as I tried to explain to myself, what are the policy choices that one has, what are the policy choices that you face. And they are basically these. There are variations on these, and some will be a little different, but they help to give you an idea and formulate an understanding of the problem.

But, you know, we are in a tough environment right now, as far as the budget. I would just like to reiterate that we think the very first step in maintaining a strong and credible sealift program is a strong and credible sealift defense force. That is what we have been trying to build with destroyers and submarines and aircraft carriers, all these pieces that you are so familiar with.

That ends my prepared testimony and my additional remarks, and I am available for questions, whatever you might choose.

[The prepared statement of Mr. Pyatt follows:]

STATEMENT OF

EVERETT PYATT

ASSISTANT SECRETARY OF THE NAVY (SHIPBUILDING AND LOGISTICS)

STRATEGIC MOBILITY

I am pleased to be here today to talk about fast sealift and our part in strategic mobility. In war, more than 90% of our war materials and about 99% of our fuel will go to forward theaters in ships. The only way to move large amounts of replacement forces and heavy material overseas is in ships.

Airlift can flexibly and rapidly deploy and sustain small forces and is essential to the strategic mobility of our defense forces. Our airlift capability today is about 46 million ton - miles per day in a fleet of hundreds of aircraft with an inventory replacement value of about $60 billion.

Sealift is absolutely essential to deploy and sustain large military forces in hostile operations over global distances. Just ten 30-knot monohull fast sealift ships, with an inventory replacement value of only about $2.5 billion, can lift an average of 12,000 tons per day to a 4000 mile distant theater. There is no substitute for sealift in our national strategy of forward defense.

This is why we have undertaken and achieved many successful sealift initiatives in the past eight years, including:

- Construction or conversion of 13 pre-positioning ships for three Marine expeditionary brigades,
- Conversion of eight 33-knot commercial ships into fast sealift roll-on roll-off ships,
- Construction of five sealift tankers,
- Conversion of two tankers into hospital ships,
- Conversion of ten container ships into auxiliary crane ships with two more planned,
- Conversion of two roll-on roll-off container ships into aviation logistics ships,
- Expansion of the Ready Reserve Force, including roll-on roll-off ships, break-bulkers, tankers, and other ship types, to 92 ships by March 1989, with plans to continue this expansion.
- Procurement of sea sheds and flat tacks to provide container ships with the capability to carry large size unit equipment.
- Procurement of equipment to facilitate cargo unloading in undeveloped ports.

Despite the comprehensive Department of Defense sealift program our total national capability has remained relatively static due to the decline of the merchant marine fleet. Our sealift programs have provided essential seagoing jobs for mariners and preserved a sector of the non-combatant national shipbuilding industrial base that has been hard hit by the lack of commercial ship construction in the United States. The Department of Defense posture today in sealift compared to Defense Guidance is better than it has been for many years, as VADM Arthur has summarized in his statement.

Even with our comprehensive program though, there are concerns about the future as we see continuing adverse trends in the maritime sector of our economy.

As we examine fast sealift and other actions that could further improve our sealift posture, we need to understand sealift in the context of global strategic mobility. Strategic mobility is a series of transportation linkages and mode changes that move the materials of war from unit stowage to front line combat troops. One way to illustrate the movement of war material from Kansas to Germany is to outline the following 18 transportation linkages and mode changes:

- Unit stowage
- Stowage breakout and prepare for transportation
- Load land transportation vehicles (truck or rail)
- Marshal land vehicles for land transit
- Land transit
- Unload land transit vehicles
- Stage material in port
- Load ships
- Depart port, transit minefield clear routes, marshal ships for sea transit
- Sea transit
- Transit minefield clear route, enter forward theater port, marshal to unloading piers
- Unload ships
- Load forward theater land transit vehicles
- Marshal land vehicles for land transit
- Land transit
- Unload land transit
- Marshal for combat deployment
- Deploy to combat

Despite the fact that some of the above activities will be concurrent, it should be clear that strategic mobility is very complex and requires a high degree of system organization. The objective of strategic mobility is to deliver combined arms combat units with the correct mix of troops, equipment, ammunition, and supplies at the right time and the right place at the combat front.

Balanced investment and engineering is required in each aspect of the strategic mobility chain, otherwise our combat units at the front will not be effective. We cannot over-engineer or over-invest in one element at the expense of other parts of the strategic mobility equation. Balanced improvements in airlift, landlift, sealift, afloat pre-positioning, and land pre-positioning are needed.

Likewise, within a particular element, such as sealift, we must make practical and pragmatic choices.

For example, if we create a notional timeline for the 18 transportation linkages and mode changes assuming a 40 mile per hour land transit and a 20 knot sea transit, we could find that it might take over 400 hours to move a combat unit from Kansas into the front lines in Europe. This distribution of time could be:

Mode changes	168 hours
Land transit	35 hours
Sea transit	200 hours
	403 hours

For no investment in research and development, we could increase the sealift link from 20 knots to 30 knots by investing additional production dollars in existing technology. This could reduce the total time by 67 hours as follows:

Mode changes	168 hours
Land transit	35 hours
Sea transit	133 hours
	336 hours

With a multi-billion dollar, decades long research and development program, followed up by additional decades and dozens of billions of dollars of production funds, we might achieve a 50 knot sealift capability. These ships would cost more, be less numerous, and be limited in their cargo capacity. The time would be reduced by another 53 hours as follows:

Mode changes	168 hours
Land transit	35 hours
Sea transit	80 hours
	283 hours

However, an operational deployment concept of prepositioning afloat in Europe would eliminate almost 300 hours from this timeline. For example, with no investment in ship research and development 30-knot ships carrying the duplicate unit sets could be stationed in the large ocean expanses anywhere within 500 miles of a forward theater debarkation port and reach the port within 24 hours. The elapsed time for the first lift could be reduced from more than 400 hours to just over 110 hours, as follows:

Mode changes	84 hours
Land transit	5 hours
Sea transit	24 hours
	113 hours

Investments in technology cannot substitute for wise initial deployment decisions. This is precisely why we invested in the 13 pre-position ships on station now in forward theaters for our Marine Corps. Our studies also have shown that sealift force levels and fleet cargo lift capacity are more important than high speed. Investment in technology for higher speed, and investment in the higher horsepower required, reduces the number of ships that can be bought, and for the more exotic technologies, also reduces fleet cargo lift capacity.

Of course this is all purely speculative because there is no fast sealift new construction program. Beyond the Ready Reserve Force, there is no ship procurement program to further improve our sealift posture.

In the current budgetary environment, we must prematurely retire 49 frigates and destroyers and one aircraft carrier. We have squeezed out attack submarines and destroyers from our five year shipbuilding plans. These are the very ships we need in war to contain the threat against our sealift ships in their strategic mobility and logistics support missions for our forces deployed to forward theaters. We cannot absorb a fast sealift program within our budget when we cannot even support our high priority warship force levels.

In summary, during the 1980s, we have been able to make substantial investments in improving Department of Defense sealift capability. However, there are adverse trends in the maritime sector that, if unchecked, will continue to erode our strategic mobility posture. Pursuing developmental programs for fast sealift technologies will not reverse these trends. In the current budgetary environment in which our fleet warship force levels are declining, our ability to forestall erosion of our strategic mobility posture is extremely limited.

Senator KENNEDY. Thank you very much. Maybe I will direct this to General Cassidy, but I would appreciate your other——

Mr. PYATT. General Cassidy, sir. May I defend him?

SEALIFT CAPABILITY

Senator KENNEDY. I was just looking at all the gold on the sleeves there. I should have recognized the stars.

In your testimony, you talked about this revised concern or attention that is being given to this whole issue of the surge aspect of the sealift capability, and the new attention that is being given by the responsible officials, both in the Defense Department, the National Security Council and the White House.

And I think there is evidence of that. Part of it, I think, is a tribute to the development of the command in coordinating and bringing these issues together in a coordinated way, which reflects on the total national security issues.

But, you know, in reading back over the history of the development of a plan, even going back to the time of President Nixon, there are all statements, comments, proposals, propositions that have been made, but you really cannot get away from the overall concept that if we fix the commercial aspect of the Merchant Marine, that this was going to really be a key, in providing that degree of support for the Navy. I think that that is a fair conclusion. You might differ with that. But at least I think that is a reasonable amount of argument to be made in favor of it.

Nonetheless, we have seen a continued decline, in terms of the Merchant Marine. It has been going on for some period of time, but it has been going on and on and on, and continues to go on.

Now we have the recognition of what we are. Still we have important sealift needs. We do, if we make no agreements in terms of Western Europe. General Otis and others have testified, commented and written about that. If we are able now to, perhaps even with the surge aspect of our sealift, get about 80,000 tons there in the 10-day period, with the need of approximately 200,000 tons. So we have a deficiency there.

If we get a conventional arms agreement, it is completely unrealistic, at least to me, others may differ, to think that we are going to be committed to destroying military equipment over there and be able to leave prepositioned equipment there for the military divisions. I mean it is completely inconsistent. I mean maybe the negotiators are going to be able to negotiate it, but it seems to me to be completely inconsistent, or the Soviets are going to do the same thing, and basically undermine any kind of potential agreement.

So that has to be at least on the table.

And then if you get into a situation where you achieve what President Bush has outlined, let alone what the possibilities are in terms of the future, and looking down, given the timeframe that we are talking about in building and developing this whole concept, there will be even a greater need, because we are going to have to move equipment, as has been pointed out by the earlier panels. We are an island. They move them down to the railroad tracks; we move them across an ocean.

So if you put all of those elements together on it, it seems to me to raise this to a rather different kind of level than we have seen in the past years, where we had the ability to purchase ships that were not being utilized and to put them into the sustaining force. But we still have this gap, whether we do get an agreement or not. If we do get an agreement, it is more dramatic.

We have got very little indication about what is happening in the commercial lines to give us any sense of hope, in terms of the future. And why shouldn't we, in a serious way, as has been outlined and just touched by the earlier testimony, recognize that in this case it is going to be the Navy that is going to have to take on this particular issue in working with General Cassidy, and that there may very well be important spinoffs in terms of the commercial section to help meet broad national interests in balance of payment and world trade, which we are all moving toward, for the late 1990s and the year 2000.

If the Navy and General Cassidy are not going to do it, who is going to do it? And if there is that need, what can we expect, given the fact that the administration has actually requested less R&D for this program?

You know I think a case could be made on the testimony today that we are going in the wrong direction, in terms of even the types of matter in looking at the reductions or the reduced requests, for R&D programs.

It is a broad question. You can probably grab it from any point that you would like to. But how would you respond? Maybe each of you could take a bite of it.

General CASSIDY. If you will permit me to respond to just a couple of pieces of that.

I think your historical perspective of that is quite correct. But things have changed a bit that make today a little different. The big difference is what other countries have done, which we have no control over, and then what our Navy has done. In fact, as Secretary Pyatt and Admiral Arthur have said, with the inception of the Ready Reserve Force, and that has only occurred within the last 8 years or so, and the building of that force from the 92 ships that we have right now up to some number above that, between 92 and 140 we have done some of the things that you suggest are necessary for the initial response capability.

So we have responded to what is going on in the world and the different kinds of shipping that have occurred. The need for RO ROs in that RRF fleet has been recognized, and there are quite a few RO RO ships in that fleet.

The other thing that has occurred is the phenomenon that other countries have established national policies of their own to capture the maritime world and become big in it. The gross and classic example is China. China, 25 years ago, had 60 maritime ships plowing the seas. Today they have over 1,200. It became their national policy, and they carry well over 70 percent of their goods in Chinese-flagged bottoms—and that is just one example, sir. There are several other examples of countries which have made it a national priority to take on the maritime world and become big players in it.

In doing that they have changed, if I may use the slang, they have changed the playing field. They have made the playing field such that it is not free trade. And, in fact, our liner companies and our shipbuilding companies have not been able to compete with them because of some of the policies and laws that we have had on the books that have become archaic, and have not responded to this change, which I have attempted to describe.

So we have got to get on with making sure that the playing field is indeed level. And if we can do that, and I believe that is Government's role to do that, then I think our Merchant Marine can jump in. And with a good viable Merchant Marine and a good Ready Reserve Force, those two things together will provide the ships necessary and the manpower pool to man all those ships.

And I remind the committee that the manpower pool for the Ready Reserve Force all comes from the Merchant Marine. And even those SL–7s that we have been discussing to some degree the eight ships, the manning for all of those ships, all of the ships that are assigned to my command in wartime come from the Merchant Marine of our country.

So I think some things have changed.

Now, with regard to the research and development, I think that is our long suit, and I think we must make a commitment to research and development. And frankly, I do not know how to do that, because I believe it should be commercially viable. On the other hand, certainly the Navy should and must control some of that research and development.

So I would defer to my Navy friends on those issues.

Senator KENNEDY. Admiral.

Admiral ARTHUR. Several years ago—in fact, it goes back almost 30 years—going fast at sea became an interesting item for the Navy, once we figured out how to furl the sails and get on with some other forms of propulsion. After those 30 years, we have culminated in what General Cassidy and I rode on just a few weeks ago at Patuxent River, the SES–200, the largest surface-effect ship in the free world; and it is only about 210 tons.

We have learned a lot of things. We have learned a lot about lift. We have learned about ride control and how to stabilize those ships at sea. At one point in time, we even had a frigate on the drawing boards that used SES technolgoy. And yet, when it came time to finally run that through the process in the Pentagon, we found that the compelling need for that extra speed just was not there, and we never pursued it.

As General Cassidy mentioned, we have continued to watch the commercial sector, which has always been our strong suit whenever it came time to lift heavy equipment—now we have seen that commercial sector go away.

We would hope that it can be revitalized, but we do not know how to do that ourselves. Quite frankly, over the past few years, as we crafted our budgets we had to prioritize those things that will stand the test of time: those absolute requirements that cannot be provided elsewhere. Of course, the combatants come down on that side of the coin, and there is always a rosy view that perhaps something will happen in the commercial sector that will keep us from having to pursue the issue any further.

It has been an affordability problem for us. There is certainly a lot of interest from our standpoint in the things that Dr. Costello mentioned; electric drive and superconductivity. All those interests are buried within our system somewhere, where there is a little bit of effort going on to make sure that we know what is there and what the future holds. But quite frankly, we have not been able to get that into priority, relative to the things that we must have, and we are the only people who can do that.

MULTI-MISSION SHIP

Senator KENNEDY. Secretary Pyatt, let me give you a hypothetical situation, where the Congress made the judgment to both authorize a robust program, even appropriate the funds, for sealift capabilities, and you have been directed to develop, to the greatest degree practical, a multi-mission ship, at least for sealift and amphibious lift, and directed to determine to what degree standardization, commercial, military design considerations are possible. And finally, the Congress indicated to you that speed is important, recognizing that other countries have a headstart on some of that technology but that the Navy has been directed to take the lead in developing a candidate hull and propulsion systems.

How would you proceed with such a program, just hypothetically?

Mr. PYATT. You put a twist on it that is a little surprising, the amphibious lift twist. Since having taken a beating on trying to do that about 4 years ago, I tried and was unsuccessful.

Senator KENNEDY. Well, history is going to indicate that you are correct, as I just touched on in our last meeting, but why don't you take a crack at it.

Mr. PYATT. Maybe we should have more aircraft carriers. Let us separate the problem. If the issue was to build a sealift ship that were to go your scenario of a second ago, related to conventional force balance, and what do you do to become our equivalent of the Urals—where is our Urals? I would say it is the east coast.

And I would build a pretty conventional 30-knot ship, roughly SL-7 size, based on the AOE-6 or DDG propulsion system, because they are about the right size. And that would be a $250 million to $275 million ship. I know how to do that. I know how to commit to the price, to the design, and there is no risk, other than normal.

Senator LOTT. Would you yield for a question on that point? Would you need a lot of R&D funds?

Mr. PYATT. No, I would just go build it. Design is involved in ship construction, but that is part of it anyway. There would be a very limited amount of R&D involved to prepare the design package, $2 million to $4 million, I guess. It is small in this overall thing.

If you said, "Well, speed is more important than that," and you wanted 50 knots, I would go back to the report that we gave you, and I do not remember the exact numbers, but there are billions involved and plenty of time uncertainty. It is a big job. It is a big scaling to go from 200 tons to several thousand.

The productivity of a fast ship, because so much of the structure and weight is used in fuel, is rather limited. And if you put on a further constraint of, "this is how fast stuff has to be delivered," I think I would throw up my hands and say, "I do not know how to do it," based on the physics of the problem, the amount of fuel that one consumes running fast, making the lift fans lift the ship up. This thing is virtually an airplane, it flies rather than floats.

So, one project I would sign up for and say "I know how to do it; here is the cost and here is the schedule," and the other one I would not know how to do in a timely fashion.

Senator KENNEDY. Is your response to the question also giving consideration to the other types of technologies that either the Japanese are considering or using? I guess they are spending in excess of a couple hundred million dollars a year, in terms of some of those.

Mr. PYATT. Yes. Because all the data I know of—again, we did this work about 10 years ago, or so, with the surface-effect program that we had. That program started out in 1964 or 1965, called the Captured Air Bubble. And the concept at the time was very familiar with what we just heard, to make a commercially viable ship that would be useful for both military and commercial operations. It never passed that test.

And we had people from the MARAD on this study, and I remember several statements related to me from the people from MARAD that said, "This has no commercial viability at all because of the operating cost." I believe that statement is also in the report.

Of course, I love doing R&D. I would love the opportunity to go chase the technological fund, but I would not make any promises.

Senator KENNEDY. How many ships, Admiral Arthur, would you need to make up for the deficiency percentage, in terms of surge?

Admiral ARTHUR. If we could build a fleet somewhere between 10 and 20 ships of the capacity that the present SL–7s could haul, I think we would come very close to making those numbers.

Senator KENNEDY. My time is up. Senator Lott.

Senator LOTT. Thank you, Mr. Chairman.

I find this all very interesting and enjoyable. I have a lot of questions I would like to ask, but I will try to limit them to just a few.

Again, Secretary Pyatt, I believe what you are saying is, while you would be glad to have the R&D money—you said it—to go chase the new technology and capability, the fact is, we could go ahead right now and construct the 10 to 20 ships that we need with the technology we have to do that job over a relatively mid-term bracket; right?

Mr. PYATT. If that is a decision of Congress, I know how to carry out that program. As I say, it is not in the budget, but we have been through enough of it. It is a ship very much simpler than what we build now, and even auxiliary ships that we have built. We converted the SL–7s, we know our mistakes, we know what we did right, and I think we have an adequate technological base to build on.

Senator Lott. Admiral Arthur, you confirmed what has been said earlier, I think today, the present trend in merchant ships is always from the type we would need.

Admiral Arthur. Yes, sir.

Senator Lott. So the Navy does not have what we would need and the merchant trend is away, so we are going to have to look in the future to having some way of having these ships available to us if we have an emergency; right?

Admiral Arthur. Yes, sir.

Senator Lott. General, you mentioned once again about the fact that you felt very strongly that this really needed to be a non-military function. I believe that is what you said, right, for the most part?

So that means that you are saying it needs to be a private function, or a Government private function, right?

General Cassidy. I think it needs to be the Merchant Marine in its classic sense. I think it is the ultimate solution to our problem.

Senator Lott. And you made reference to the fact that only 4 percent of our trade goes on U.S. ships, right?

General Cassidy. That is correct.

Senator Lott. So you are inferring again the cargo preference?

General Cassidy. Well, I am not necessarily.

Senator Lott. Well, let me put it this way. Are you advocating cargo preference?

General Cassidy. I am not advocating cargo preference, because I think there are other solutions along with that. My point is——

Senator Lott. Well now, you said along with that.

General Cassidy. I do not think that that is the only solution, and I think we must sit down together and figure out exactly what we, the Government, must do to solve that problem.

Senator Lott. Well, let me put words in your mouth then. For us to have a goal of 40 percent or 8 percent, whatever, of our trade—American products going on American bottoms would solve our problem, right?

General Cassidy. It would certainly go a long way in solving it. Yes sir.

Senator Lott. Well, I am an advocate of cargo preference. Have been for a long time. Of course, we are facing the Washington Post, the Wall Street Journal, the New York Times blasting us for saying this will drive up consumer cost. But I think the alternative of not having that capability is very dangerous.

So you are saying—well, I infer from what you are saying a cargo preference, or something along those lines is a goal we may have to consider?

General Cassidy. I think so, sir. And there are other things, for instance, bilateral agreements with other countries, all sorts of things, diplomatically——

Senator Lott. Bilateral agreements that would do what?

General Cassidy. Well, we will guarantee that a certain amount of cargoes going to or from a country will go on their ships and our ships, and then another amount will be up for grabs, whoever can get it.

But, nonetheless, we are the largest trading Nation in the world and we should control our destiny to some degree.

Senator LOTT. I agree with you very strongly, and I think it is important that somebody say these things, and very bluntly.

You also suggested incentives to shipbuilders. What do you mean? Specify a few examples of what these incentives could be.

General CASSIDY. I am talking incentives to both the shipbuilders and the others. For instance, we in the Department of Defense do over a billion dollars a year of direct sealift business in the peacetime world. I think we should use that money wisely and incentivize the industry as much as we can. Incentivize the liner industry, which will, indeed, in turn incentivize the shipbuilding industry.

If we build up one segment of the industry, the other part is bound to follow.

The point is we should use what we can use in this country now to our great advantage. And that is, I believe, that every peacetime dollar spent for transportation should have a readiness component to it. Readiness in my mind is a good Merchant Marine, a good Civil Reserve Air Fleet, and a good and healthy port and rail and infrastructure in our country.

Senator LOTT. Maybe I missed it, but tell me again, specifically, a couple of incentives you are talking about.

General CASSIDY. Well, the incentive, sir, would be our business.

Senator LOTT. In other words, our business would go on our, on these merchant ships, right?

General CASSIDY. If I may use the analogy of the Civil Reserve Air Fleet and the Military Airlift Command.

For years now, for almost 30 years, we have sat down and said we will give you our business, peacetime business, based upon your contribution to our wartime need.

And, therefore, Mr. American Airline, or United Airline, or Flying Tigers, if you will build and buy and operate the kinds of airplanes we need, then we will give you a large segment of our peacetime business.

It is not a trivial amount. Certainly, it is not the majority of their business, but we are the largest single customer.

I think we should focus our attention the same way in the sealift business. And we are intending to do that.

Senator LOTT. Are things like that, included in your report that is now, or your sealift policy that is now at the White House?

General CASSIDY. No. The National Sealift Policy is much more general and does not get into specifics like that, Senator Lott. But it will provide a structure for people in the Government that will enable them to sit down and roll up their sleeves and draw up those sorts of things.

Senator LOTT. Thank you, Mr. Chairman.

Senator KENNEDY. Senator Wilson.

Senator WILSON. Thank you very much, Mr. Chairman.

General Cassidy, your comments are in many ways music to my ears.

I have sat in another hearing room at another time when a former Secretary of the Navy, who in plain spoken answers to my pointed questions said that he did not believe that we could afford to subsidize a ship construction program in all parts of the country simply for purposes of sustaining industrial base. Pier, he viewed in a different light, but ship construction he thought unaffordable.

The difficulty that I find with what you just said is that you were trying to make the analogy between CRAF and sealift. And the problem, of course, is that there is business to sustain those commercial airliners, if they did not depend at all on any military business.

Conversely, we are in a situation where there just is almost no commercial shipbuilding, and the Navy has been the only game in town for years.

And we all know about the shrinkage in the yards. There is no point in elaborating the statistics. I think we have come to a time when we are sadly lacking industrial base, and industrial capability of that kind.

I have, by and large, been a fairly consistent supporter of R&D. But that being true, what will sealift R&D do for us? It is not going to produce money. And Mr. Pyatt's problem has been that he has not had money from the Congress to build ships.

We are in a time when we are making very painful decisions. And it seems to me that over a period of years Congress has decided that sealift and airlift are not priorities, which, to me seems rather silly for a Nation that is committed to a forward strategy, that is, a policy of fighting on somebody else's soil far, far away.

That is a wise policy if you are prepared to sustain it. But we are not prepared to sustain it. We cannot sail there; we cannot fly there.

I was not here when Mr. Costello and Mr. Korb spoke. I understand, though, that they made the point that there is such a desperate need for sealift that we ought to forget the carriers, forget the Aegis, forget submarines, forget the C–17. And that, as much as I am pained to advocate more shipbuilding, does not strike me as terribly smart.

You could have a hell of a sealift, and it will never get there. If it is torpedoed, or if it is hit by missiles, there is a point in having these Aegis vessels accompany a—even a fast—sealift capability.

There is clearly the need, it seems to me, and I have never heard a CINC yet say, I have asked everyone for the last 4 years, and we have a rather extensive record, I have never heard one yet say, forget the C–17, because there is need, not only to move in volume as we have filled the records many times before with elaborate statements, but there is also a need if you are going to have your forward deployment strategy to be able to move fast; to move places where you are not prepositioned.

Now, given all of those Hobbsian choices, it seems to me that the purpose of this hearing really ought to be to determine whether or not, given this situation that General Cassidy has described as a woeful lack in terms of our present shipbuilding and sealift ability, and I would have to say the woeful act that we will correct only with the C–17.

Where do you come down gentlemen?

General Cassidy, your command is one that has required that you not be parochial. And I must say to your very great credit, you have not been.

General **Cassidy**. Well, sir, I still go back to my original statement which says I believe that the solution is a non-military solution and that our maritime industry is the fourth arm of defense.

Senator **Wilson**. Well, I am inclined to agree with you. And you said something in response to Senator Lott's question—let us put aside the analogy of CRAF and airlift. You said bilateral agreements with other nations.

I could not help thinking back as I have been sitting here, we have come to a hell of a pass.

This Nation that used to crank out liberty ships that used to run convoys through the sub packs up to Romansk and without which the Soviets would probably have been unable to sustain their effort against Hitler's armies, now, as we have said, we stipulate the fact that commercial shipbuilding is non-existent in this country. We have been undercut by foreign competition.

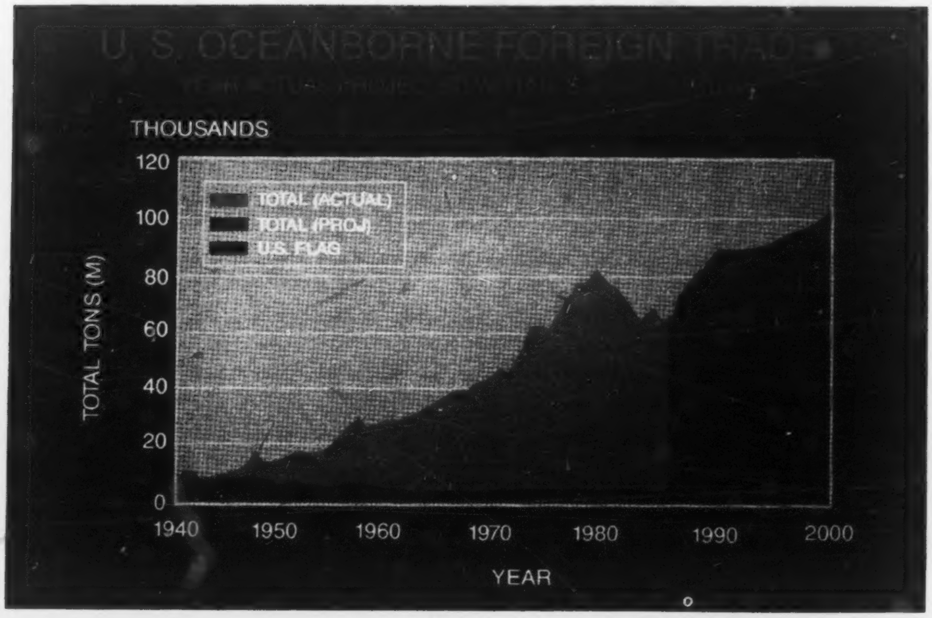
So what are those bilateral agreements? What I hear you saying is that if we were actually ever to have to do that kind of thing again we would have to look to the rest of the free world that has that Merchant Marine capability that we lack.

General **Cassidy**. Well, we certainly plan to do that. But, once again, if I could just go back to my simple premise and maybe it is overly simple. Maybe it is even naive, but we have got to start somewhere.

I did not know much about the shipbuilding, or the ship liner, or the ship operating industry 2 years ago, but I know a lot about it now, sir. I really do.

I have climbed over ships and I have been in shipyards. My initial view of the industry reflected what people in this city of Washington told me, that it was a stodgy old industry that had been to the public trough for too long. And I've now learned nothing could be further from the truth.

Our liner industries are viable. They are modern; they are high tech, and they know how to compete. And I believe that if we give them a fair chance at competing, they will go get the business. And the business is there, Senator.



When you look at the charts, and I can show you several charts, and would like to offer one for the record, showing that from 1950 on, the business went up exponentially, something like sixfold. And our percentage of the market went down.

So my point is, we have got to provide, through regulations, through tax incentives, through every kind of way we can, incentives for this industry because it is not just another industry. It is the Merchant Marine of our country. It is the fourth arm of defense. So it cannot be treated just like another industry. It must be given some special attention.

And then if we capture that market share, then our shipbuilders can compete just as well as shipbuilders in all of the other countries. And maybe they will do some of the very inventive things that are being done now in other industries, which are joint ventures with those in other countries, with our friends, with our allies. That is being done in the airplane business now.

And if we would go out and capture that market share, we could use that money to influence shipbuilding and R&D, rather than spend $400 or $500 million a year on ships that just sit and rust.

Sir, it cannot help but be the right solution.

SL–7

Our SL–7s now. It is a wonderful ship, and you can get 50 people on the bridge, and it does everything but—it costs us probably a million dollars a year to maintain an SL–7 in ROS Four status.

And it should just cost you $2 million a year in subsidies to support a C–10 cargo ship, which is being operated by APL. And that money, that subsidy goes directly through to the labor force, which we need to build up to keep the whole thing in balance.

We have lost our equilibrium, and I go back to the Merchant Marine Act of 1936, which states explicitly what the country should do.

It starts out by saying it is necessary for the national defense and development of its foreign and domestic commerce that the United States shall have a Merchant Marine sufficient to carry its domestic, water-borne commerce.

If our country, all of us collectively, would have obeyed the law, it would have solved the maritime industry problem.

Senator WILSON. Mr. Pyatt, you have the doubtful distinction of having actually to do this job with the resources that are available. What would you add to what General Cassidy said by way of agreement or disagreement?

Mr. PYATT. I think you have to divide the problem into a couple of segments. One is the liner problem. The second is initial delivery, how you deliver Army equipment someplace. It is a different problem.

Let me dispense with the second one first. I believe—I have been in this for awhile and know a little about it. I believe that there is no commercial viability for a ship designed to deliver Army RO RO equipment.

We went through this when we went through the prepositioning of ships for the Marines. And it turns out that the density of the equipment and the weight is such that you have to dramatically overbuild a ship for one that would carry cars, for example.

And there are not that many bulldozers being exported, imported into the United States to make very much traffic.

So I think that, like it or not, I have been a long time coming to this conclusion because I have rejected it several times. My thought pattern is not that different from the General's.

Like it or not, in the end the U.S. military has to provide that kind of shipping, because there is no commercial viability for that kind of ship.

Container traffic is substantially different. This is the kind of traffic that would sustain a military operation. It is heavily containerized now.

The General can, undoubtedly, give you a number, but my impression is it is quite high.

Ammunition, food, all the consummables that go on. And that is the portion of the liner traffic that we need to be worried about. That is the portion of the liner traffic where we recently allowed ship operators to buy overseas—1983 or 1982.

And that is to me the one act of Congress and the executive branch that led to the demise of the commercial shipbuilding industry in the United States along with the oil-rig situation.

So, that is also an area where, when you look, it appears that there had been substantial commercial subsidies by exporting nations to support these liner operations, and that I think, I have suggested within trade agreements that exists, it would be a profitable place for those involved to explore, to see whether or not the things you hear are true.

Other than that, if you cannot generate more traffic, then it becomes a military problem again. And I think it is all in traffic generation, whether or not there is free trade.

I have talked with some of our operators and they say they cannot even get the opportunity to bid on bringing stuff here. It is all locked up overseas. Well, that is not fair. And if they can bid and cannot win it, I could care less. But they ought to have the right to bid, and we ought to enforce for imports into the United States the obligation to get American bids on container traffic.

That would be one specific step that would see what it is like. To see whether or not the industry has the creativity and the viability to be commercially competitive. If they are not, it is back on our back.

That is how I would approach the problem. Those two pieces.

Now, I guess—one second, sir.

The other thing, and Senator Kennedy alluded to it earlier, and Senator Cohen alluded to it, and that is what is going on now.

Do we have massive redeployments of U.S. troops? How do you worry about getting back, and that is why we put the section in here about prepositioning, because it is a viable alternative. And maybe a useful application of seapower.

But if you do not separate the problem, I do not see an answer.

Senator WILSON. Thank you very much. Thank you, Mr. Chairman.

Senator KENNEDY. I think on the prepositioning, if we hear what we heard in the Armed Services Committee, it is difficult in terms of the proposal of the administration.

It is difficult for me to believe that they are going to be permitted to preposition those ships and that equipment in the general areas of which have been outlined by the administration in terms of——

Mr. PYATT. In my discussion I was talking about preposition on the east coast of the United States in ships.

Senator KENNEDY. The only point that comes through is who is going to do this? You each have a part of this.

You know, who is going to be the one that is really going to test that? Who is going to be the one that is going to negotiate that with the bilateral agreements to try and see what kind of movement you can get on that?

Who is really going to be the one that takes the responsibility in this area, outside of what is the particular mandate that all of you have got that we have constructed in terms of our responsibility of which is a full plate?

And that is something in terms of the policy issues that I think, hopefully, we can focus on it this afternoon.

I would like to submit some questions, specific questions on technology and other matters that have been raised during the course of the hearing. But I think that is a broader policy question, which I think we have to wrestle with and deal with, and to get your kind of input on as to——

General CASSIDY. Well, Senator, if I might just add. Our National Sealift Policy which is in the White House now, provides for that catalyst.

It provides for a senior interagency group. Although it may have another name, it is, indeed, a senior interagency group of representatives from the State Department, Commerce, Transportation and Defense, which will provide direction and provide liaison with you, the Congress, to get things going and that you, the Congress and the administration can hold accountable for getting things done.

In other words, this group would sit down, it would set time lines and you could hold us accountable for getting something done.

Senator KENNEDY. I was just inquiring of staff and we have not had access to that proposition, but will certainly look forward to, hopefully, getting their reaction and their response.

It is an enormously important challenge that you put out, and we, obviously, want to be constructive and positive in this area, because it is not only as you have pointed out, but others who are on the receiving end, the various CINCs have pointed out, it is an area of enormous importance.

This has been a very interesting and informational hearing.

Unless other members have questions, I have just a few technical kinds of questions on some of the technologies which I would submit for the record.

But I want to thank all of you very much for joining with us. The committee stands in recess.

[Questions for the record with answers supplied follow:]

QUESTIONS SUBMITTED BY SENATOR JOHN MCCAIN

FAST SEALIFT

Senator MCCAIN. How valid are the current requirements for airlift and fast sealift, given the recent changes to the fiscal year 1990–91 FYDP and the changing mission requirements because of arms control.

General CASSIDY. The determination of strategic lift requirements is a complex and ongoing process. Additionally, there is a significant difference between requirements and fiscally constrained, realistically attainable programming goals. In airlift, for example, the Congressionally Mandated Mobility Study (CMMS) established 66 Million Ton Miles Per Day (MTM/D) as a fiscally constrained interim step. The actual airlift requirements that support the "forward defense" strategy are significantly higher than 66 MTM/D. Additionally, there is no specific requirement category for fast sealift, by itself. However, several studies including the 1981 CMMS have indicated shortfalls in both surge and sustained sealift capability which will result from the current decline in our maritime industry. Although we welcome the current lessening of tensions with the USSR and the progress in arms control, we believe lift requirements will most likely increase, especially if we reduce our overseas forces, while maintaining the national strategy of forward defense. The fiscal constraints of our current FYDP do not alter these lift requirements.

Senator MCCAIN. What specific steps have been taken to revalidate the requirements for fast sealift and airlift in recent years? Please provide a chronology of all relevant studies and a summary of their conclusions beginning in 1981.

General CASSIDY. The key to a truly valid mobility study is the inclusion of the entire mobility triad. That is: airlift, sealift, and prepositioned equipment. All these are unique in terms of speed, capability, and flexibility. All three contribute uniquely to the mobility equation. To meet our strategic goals all three must be adequately capable and we also require the command, control, and communications system to integrate these elements along with CONUS land transportation. With that background, there are only two studies which meet the criteria of examining all these elements: the Congressionally Mandated Mobility Study (CMMS) of 1981 and the ongoing, Revised Intertheater Mobility Study (RIMS) which should be released by OSD in the near future. Airlift requirements have been addressed in those two studies, as well as a DOD Sealift Study in 1984 and a Congressional Budget Office study in 1985 "Improving Systematic Mobility." All of these studies indicate that airlift requirements significantly exceed our current goal of 66 MTM/D. Though there is no specifically stated requirement for fast sealift, the DOD Sealift Study of 1984 and several reports from the Commission on Merchant Marine and Defense culminating in the fourth report of 1989, indicate our nation's overall sealift capability is marginal at best; and if the declining trend in our merchant marine is not reversed, we will not have sufficient ships or skilled mariners to meet our strategic goals.

Senator McCain. What analyses exist of the relative priorities for airlift and fast sealift? Please provide a detailed chronology and summary of such studies or planning efforts since 1985.

General Cassidy. We are not aware of any such analyses. Airlift, sealift, and prepositioned equipment are all unique elements of the strategic mobility equation. Like a three-legged stool, all legs must be adequately strong or the stool will collapse. Establishing priorities indicates one could be weakened to strengthen another. This is not the case. Shortfalls exist in all three of these elements and actions are necessary to strengthen them. We are making great strides in airlift with the C-17 program. Furthermore, efforts such as the Improved Force Closures for Europe (IFCFE) study are examining the best use and location of prepositioned equipment. The only real solution to forestall a significant sealift shortfall is to take national action through a coalition involving the administration, the Congress and the maritime industry itself to reverse the trend of our declining Merchant Marine.

Senator McCain. What shortfalls are projected in airlift and fast sealift in 1990, 1994, and 2000 under current FYDP funding levels? How do these shortfalls vary by theater in the event of the planning goals set by the Joint Chiefs?

a. For the NATO theater?
b. For Northeast Asia?
c. For USCENTCOM?

General Cassidy. Based on the current FYDP, we project delivered aircraft capability versus the programming goal of 66 MTM/D to produce shortfalls of about 18 MTM/D in fiscal year 1990 and 13 MTM/D in fiscal year 1994. The current program will allow us to meet the fiscally constrained goal of 66 MTM/D by the end of fiscal year 2000. All mobility studies indicate total airlift requirements exceed the 66 MTM/D programming goal. In addition, these shortfalls, like the goal, are global in nature and not apportioned to theaters. Should we need to execute our war plans, the Joint Chiefs will provide direction on apportioning existing capability. Since there is no procurement program for fast sealift in the FYDP, there are no specifically projected shortfalls for fiscal year 1990, 1994, or 2000. However, all major sealift studies indicate declining sealift capability versus the requirement. Probably the most definitive statement comes from the Commission on Merchant Marine and Defense Study. With the current downward trend in the maritime industry they projected a shortfall of 290 Merchant Marine sealift ships by the year 2000 along with a shortage of about 12,000 skilled merchant seamen if corrective action is not taken to reverse the decline.

Senator McCain. What priorities would exist for changes in the current FYDP (fiscal year 1990–1994) if the combined funds for fast sealift and airlift were raised by 10 percent, cut by 10 percent, or cut by 20 percent? How would this affect major procurements in each year of the FYDP, and the overall shape of major procurement programs like the C-17 and fast sealift ships?

General Cassidy. First, there is no procurement program for fast sealift ships in the current FYDP. Second, it is not realistic to consider combining or prioritizing airlift and sealift programs. Each has a unique contribution to force projection and each is a unique element in the strategic mobility equation. The only current major procurement program in strategic mobility is the C-17. Any reduction to this program, which is well underway and receiving strong support from both DOD and Congress, will result in delays in fielding the aircraft and in meeting our 66 MTM/D goal. In addition, short term reductions would increase the C-17 unit cost and the overall cost of the program and severely degrade our determined efforts to address the significant transportation shortfalls within the DOD. On the other hand, additional funds in the short term would ultimately reduce costs and help to quickly achieve optimum production rates.

Senator McCain. How would the above priorities change if the President's plan for reductions in U.S. forces in Europe, and the NATO conventional force reduction plan, were fully implemented?

General Cassidy. Reduction of forward based forces, assuming our commitment to NATO and our forward defense strategy is not totally altered, will result in increased priority for mobility. Although there is no fast sealift procurement program in the FYDP, there must be a national commitment to reverse the trend and revitalize the U.S. Merchant Marine as the fourth arm of defense. The priority of the only major mobility procurement program, the C-17, must also be increased if forward based forces are significantly reduced.

[Whereupon, the committee was recessed at 4:05 p.m.]

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